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WORK PERFORMANCE AS A FUNCTION OF THE INTERACTION OF ABILITY, WORK VALUES, AND THE PERCEIVED WORK ENVIRONMENT

ROBERT LEE HANNAN

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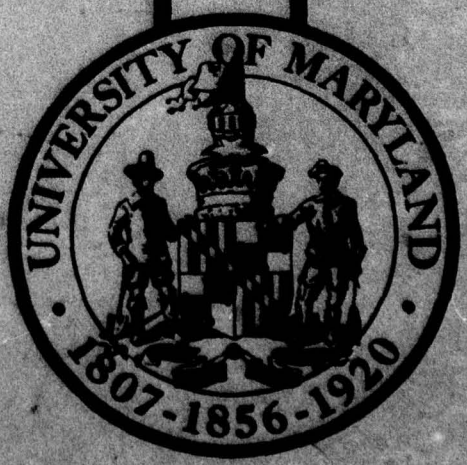

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Literature pertaining to the prediction of performance from ability, motivation and their interaction was reviewed. Three personal traits (achievement motivation, locus of control, and bureaucratic values) are examined as possible antecedents of work motivation and performance. A model of work motivation that depends on the strength of the personal traits interacting
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with their environmental compatibility was developed. An empirical study of 417 police officers was conducted to test hypotheses generated from the models. Measures of the personal traits were developed and administered along with a questionnaire used to ascertain perceptions of the work environment. Supervisors' ratings of performance were collected as well as demographic and ability measures. Moderated multiple regression analyses found strong evidence for the performance-related validity of the work motivation model. Neither ability nor the ability-motivation interaction showed any relationship to performance. A test for an interaction between achievement motivation and locus of control also failed to reveal a relationship to performance. Other analyses indicated that all three traits appeared to be associated with work motivation through relationships described by the model developed here.

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I. INTRODUCTION

Motivation and Ability

Fifty years ago, Clark Hull wrote:

> In conclusion, we may summarize the foregoing evidence as to the relative importance for success of the determining factors considered above. Assuming each to be disentangled from the complex overlappings of the others, their respective contributions are judged to be approximately as follows:
>
> Capacity or ability 50%
> Industry or willingness . . 35%
> Chance or accident . . . . 15% (1928, p. 193)

Hull (1928) acknowledged that a large gap existed between typical predictor-performance correlations of that time (in the low .20's) and the theoretical relationships he was proposing (which imply correlations on the order of .70). Just the same, he believed that continuing research efforts would soon narrow the gap considerably. Unfortunately, Hull's prophesy has not passed the test of time.

Atkinson (1974) and Ghiselli (1966) have both noted the lack of improvement in the average predictive validity of ability tests since Hull's era. Ghiselli (1966) reported the average contemporary correlation to be approximately .20. This estimate was based on a review of every study

(both published and unpublished) that he could find dating back to 1923. Although progress has been made in such diverse areas as better techniques for the selection of predictors (e.g. Wherry, 1931, 1941), improved criterion measures of performance (e.g. Smith, 1976), identification of moderator variables (e.g. Zedeck, 1971), refined methods for job and task analyses (e.g. McCormick, 1976), and even job redesign (e.g. Chapanis, 1976), little overall improvement in the predictive validity of ability tests has been achieved.

On the motivational side, progress has been equally dismal. Many theories have been promulgated, but empirical support for the motivation-performance relationship has usually been even weaker than that found for ability and performance (e.g. Dunnette, Note 1). Adding to this problematic state of affairs is disagreement among theorists on a single definition of motivation and on the determinants of motivation. Other drawbacks have included the absence of directly competing hypotheses or a common behavioral domain to be explained (Campbell & Pritchard, 1976). Based on an extensive review of work motivation research, Campbell and Pritchard (1976) reached the conclusion that:

> ...the available theory is too lacking in precision to make specific predictions about behavior that can be confirmed or disconfirmed by some overall 'test'. (p. 122).

In spite of these problems with work motivation research, the notion of motivation and its relevance for understanding performance has intuitive appeal. Theoretical differences often revolve around certain themes. Noting similarities among most definitions, Steers and Porter (1975) presented the following three "common denominators which may be said to characterize the phenomenon of motivation ...

(1) what energizes human behavior;

(2) what directs or channels such behavior; and

(3) how this behavior is maintained or sustained." (p. 6)

As the number of motivational theories has increased, so have the number of attempts to integrate them into a unified nomological network. The intent here is not to make another attempt, rather the interested reader is directed to several recent reviews of the literature (Campbell, Dunnette, Lawler, & Weick, 1970; Campbell & Pritchard, 1976; Locke, 1975; Miner & Dachler, 1973; and

Vroom, 1964). The Campbell and Pritchard (1976) chapter is probably the most recent comprehensive review and achieves a fairly respectable integration of the literature.

The Ability x Motivation Interaction

Recent efforts to improve the predictability of performance have emphasized the combination of ability and motivation measures according to certain models. The model that has received the greatest attention is the interactive model often credited to Vroom (1964). According to Vroom (1964), a person's performance results from an interaction of relevant abilities and motivations. Intuitively pleasing, this model formalizes the common sense notion that performance can not be outstanding if either ability or motivation is lacking (Howard, Note 2). Similarly, it posits that moderate amounts of ability and motivation in a person result in better performance than a great amount of one with none of the other.

Vroom's interactive model might be called a completely moderated prediction hypothesis because of the dependence of each predictor (ability or motivation) on the other in explaining performance. In this regard, Howard (Note 2)

has hypothesized that the ability-performance relationship will be stronger for people with high levels of motivation than for those with low motivation. Findings reported by French (1958) and Vroom (1960) support this hypothesis. Theoretically, one would expect a bivariate relationship between either of the two predictors and performance given that the other predictor was greater than zero and relatively constant across subjects.

In spite of its popular appeal, Vroom's interactive hypothesis has not received unanimous approval from all theorists. Cummings and Schwab (1973) questioned its generality across all levels of ability and motivation:

> Certainly at the extremes of either ability or motivation some interaction must take place...It is, however, much less certain that the notion of interaction contributes to the predictability of employee performance in applied settings where employees may be assumed to possess some minimal amounts of both ability and motivation. A simple additive approach will probably enable us to predict performance just about as well. (p.46)

Based on a study of bank clerical employees, Howard (Note 2) reported results consistant with Cummings and Schwab's additive hypothesis. She found ability and motivation described independent amounts of performance variance in

an additive model, but subsequent inclusion of the interaction term afforded no increase in power to predict performance. In a study of state government administrators, Lawler (1966) similarly found both main effects (ability and motivation) were related to performance, but their interaction was nonsignificant.

The interactive model has generated considerable research using a variety of ability, motivation, and performance measures. Because Howard (Note 2) has presented a relatively complete review of this literature, her efforts will not be duplicated here. Rather, a few comments concerning past research on the model seem appropriate.

A perusal of the literature reveals that several different forms of the interactive model have been investigated. Thus, one finds studies of the simple product term (not the true interaction), or even the statistical interaction appropriately computed, but with no consideration given to the possible "main effects" of ability or motivation. The majority of the remaining studies focus on the effect of the statistical interaction after just one main effect is considered (usually ability).

Only a few studies have looked at the most inclusive model which involves an examination of both main effects as well as their interaction. The adoption of these different models has surely had some effect on the creation of a body of literature that defies meaningful integration. Just the same, a more pronounced influence has probably been the differing conceptions of work motivation held by various researchers. Very few studies have used the same measure of motivation. Apparently, many investigators were more concerned with validating their personal theories of motivation than with validating the model.

In trying to understand this diversity in the literature, a consideration of two distinct issues seems helpful. One issue involves the use of the interactive model (or one of its variants) as a heuristic device for studying certain conceptions of motivation. Given the variety of motivational theories which abound and the absence of a unitary body of knowledge about work motivation, such efforts intended to solidify our understanding of motivation are sorely needed. Use of the interactive model as a medium for evaluating different theories is not an inherently unscientific practice as long as the axiomatic

adoption of the model is made clear by the researcher. Physical scientists have used this method to great success in studying intangible physical constructs such as atoms and molecules. It may be that this "bootstrapping" approach represents a useful methodology for improving our understanding of intangible human constructs such as work motivation.

The second issue involves the fundamental validity of the interactive model. Obviously, the model can be regarded as a testable hypothesis given valid measures of ability, motivation, and performance. One might argue that well-established measures and a unitary theory of motivation do not yet exist, thus the model can not be tested adequately. This position is probably too extreme and ignores the possibility that the model can serve two purposes concurrently. In other words, the model can be both a heuristic device for studying motivation and a testable proposition in the same study. For example, if a given measure of motivation is shown to interact with ability in describing performance, then confidence in both the model and the motivational measure is increased. If the motivational measure shows a non-interactive

relationship to performance, then support is attained for the measure but not for the model. Finally, if the measure of motivation demonstrates no relationship (additive, interactive, or otherwise) to performance, then the measure is suspect and the model remains unaffected.

In the present study, an interactive model was used for both purposes. Specifically, it was used heuristically to investigate a measure of work motivation derived from a person-environment interaction conception of work motivation. In testing this motivational conception, the interactive model itself was also undergoing investigation as a testable axiom.

In the next chapter, three personal traits or value orientations which may be useful for understanding the antecedents of work motivation are discussed. Chapter III expands upon the discussion of these traits by reviewing literature suggestive of their interaction with the environment in affecting motivation and performance. Chapter IV summarizes the previous three chapters and introduces a conceptualization that views work motivation as the result of an interaction between a person's work-oriented values or traits and his perceptions of

his immediate work environment. This conception of motivation is then integrated into the ability-motivation interaction model and certain hypotheses are posed.

II. ACHIEVEMENT MOTIVATION, LOCUS OF CONTROL, AND BUREAUCRATIC VALUES: ANTECEDENTS OF WORK MOTIVATION AND PERFORMANCE

In the last chapter, work motivation was conceptualized as that which energizes, directs, and sustains work performance. Most motivational theorists would probably concur with this position, however, they would likely disagree on the determinants of work motivation. The substantive issues distinguishing different theories of work motivation and its determinants have been discussed elsewhere (e.g., Locke, 1975; Steers & Porter, 1975) and will not be reiterated here. Rather, this chapter will discuss one conceptualization of the determinants of work motivation. The position presented here will be termed the trait or value orientation approach although similar positions have been called content theories of work motivation (e.g., Campbell et al., 1970).

Several varieties of trait theories exist in the literature. Some focus on only one or two personal attributes (e.g., McClelland, Atkinson, Clark & Lowell, 1953); other theories consider several or many traits (e.g., Maslow, 1943). The theoretical notions of Deci (1975) will be described in the next section

because they seem to provide a general framework that clarifies some of the subtle themes that are common to several trait theories. It also provides a good background for the following three sections which introduce the three traits or value orientations which this author views as potentially important antecedents of work motivation and performance.

Deci's Conception of Motivation

Based on premises derived from White's (1959) theory of effectance (or competence) motivation, Deci (1975) posited that much of human behavior is motivated by:

> . . . a person's need for feeling competent and self-determining in dealing with his environment. (p. 100)

In presenting his position, Deci was concerned with behavior in general and seldom focused on work performance in particular. This can be seen in his following description of the competence need:

> . . . a basic motivational propensity which is continually present and will be the primary motivator of behavior unless some other factor interrupts the process. (p. 100)

Deci considered several of the relatively specific needs and traits emphasized by other theorists to be acquired manifestations of the innate competence need. In this way, he linked competing trait theories to a common determinant and etiological history. Deci often referred to the competence need as "undifferentiated intrinsic motivation" when he was discussing its relationship to acquired traits:

> Children are born with a basic undifferentiated intrinsic motivation, the need for being competent and self-determining in relation to their environment. . . . As a result of interactions with the environment, the basic undifferentiated intrinsic motivation becomes differentiated into specific motives such as achievement, self-actualization, etc. (p. 92)

Whereas achievement motivation was treated as a direct manifestation of the competence need by Deci (1975), he viewed Rotter's (1966) "locus of control" concept as a trait which affected individuals' strivings to attain success and feelings of competence:

> We . . . view Rotter's concept of internal locus of control as being a necessary condition for intrinsic motivation. An internal-control person . . . believes that he can affect his environment, and he will do many things for the feelings of competence and self-determination which follow from being an effective causal agent. An external-control person . . . believes that he cannot

> affect his environment, so he will not often engage in behaviors in order to try to feel competent and self-determining. (p. 91)

Similar to the achievement motive, locus of control is a learned propensity subject to change. Repeated failures in certain situations probably lead people to doubt their control over the outcomes of their behavior. Conversely, successful experiences are likely to strengthen individuals' perceived control over outcomes and the salience of their motives related to competency and achievement.

Deci (1975) did not consider the concept of bureaucratic values in relation to the competence need. However, this author suspects that bureaucratic value orientations may function in relation to the competence need and its manifestations in a manner analogous to the locus of control trait. To elaborate, individuals' bureaucratic values may determine how likely they are to strive for success or competency in bureaucratic work environments. People who negatively value certain aspects of bureaucracy may have acquired this disposition as a result of repeated failures in bureaucratic environments.

In any case, one's values regarding the bureaucratic nature of work settings probably reflects whether one views bureaucracy as facilitative or obstructive toward one's attempts to deal competently with the environment. In very bureaucratic organizations, such values may have a strong influence on individuals' motivations to perform.

It was the decision of this author to examine only the three traits mentioned above (achievement motivation, locus of control, and bureaucratic values) as potential antecedents of work motivation and performance. This decision was based on the assumption that the determinants of work motivation may be only a subset of the factors which affect motivation in general. In this vein, Steers and Spencer (1977) have argued that global approaches to work motivation, such as investigations of "higher order need strengths" (Hackman & Lawler, 1971; Hackman & Oldham, 1976; Howard, Note 2; Stone, Mowday, & Porter, 1977), have provided only weak and inconsistent relationships with work performance. What is needed are studies of the specific traits and motives that seem

to have particular relevance to work motivation. Concerning the specific motive for achievement, Steers and Spencer (1977) write:

> Achievement often represents one component (out of many) in the higher order need strength model. Hence, if one component of such a model was shown to represent a significant variable in task-motivated behavior, the utility of the broader (i.e., less specific) concept would be questionable unless it added something beyond the n Ach component. (p. 474)

Obviously, this argument could be applied to any specific trait that is subsumed under some conglomerated composite.

In reviewing studies of the three traits of interest here, it will become apparent to the reader that few researchers have tried to directly measure work motivation. Instead, they have usually sought relationships between work performance and the traits or values. In many studies, researchers have explicitly included the work motivation construct as an intervening variable to explain how traits and values operate to influence work performance. In other studies, the notion of work motivation is not directly addressed, yet it is often implicated as the mediating mechanism. In either case,

the assumption is made that work motivation is strongly determinant of performance. To the extent that task parameters do not contradict the validity of this assumption, this "bootstrapping" inferential methodology may be the only means available for investigating work motivation and its determinants. As long as the construct defies meaningful measurement, yet maintains its popular and intuitive appeal, this line of research is likely to continue.

The Achievement Motive

The achievement motive (or, need for achievement, n Ach) has been the subject of a great deal of theoretical discussion in the literature (e.g., Atkinson, 1958, 1964; Atkinson & Feather, 1966; Heckhausen, 1967; McClelland, 1961; McClelland et al., 1953; Rosen, Crockett & Nunn, 1969; and Weiner, 1970). Rather than reiterating the extensive discussions available in these works, a brief description of the achievement motive will be given followed by a review of some of the research that has looked at its relationship to work performance.

Many definitions of the achievement motive can be found in the literature, but most of these overlap to a great degree. Murray (1938) defined the need for achievement as a need to overcome obstacles, to attain a high standard, and to excel, rival, or surpass others. McClelland et al. (1953) saw it as a relatively stable predisposition to strive for success. Litwin and Stringer (1968) define n Ach as ". . . a need to excel in relation to competitive or internalized standards." (p. 12). Similarly, Lawler (1973) described the achievement motive as ". . . a desire to perform in terms of a standard of excellence or as a desire to be successful in competitive situations" (p. 20-21). As noted earlier, the achievement motive is generally considered to be acquired via learning processes during human development (Deci, 1975; McClelland et al., 1953).

Because the achievement motive represents an inferred disposition or propensity, some theorists have preferred to define it in terms of its presumed manifestations. Based on Hermans (1970), Litwin and Stringer (1968), and others, a strong achievement motive is probably present if a person demonstrates a preference for:

(a) tasks where success depends on personal abilities and effort rather than chance or luck;

(b) having sole responsibility for the accomplishment of tasks rather than sharing responsibility with others;

(c) tasks of moderate difficulty rather than very easy or nearly impossible tasks;

(d) tasks that involve the challenge of competing against some standard of success or other people rather than tasks with no apparent goal or challenge;

(e) individualized concrete feedback regarding task performance rather than ambiguous feedback, group feedback, or no feedback at all;

(f) improving personal knowledge and skills and career advancement rather than "resting on one's past laurels" and striving only to maintain one's current social status.

Collectively, these preferences represent an operational definition of the achievement motive that is reflected in the items and scoring techniques used in many measures of the motive. Some of the more popular measures include McClelland et al.'s (1953) Thematic Apperception Test (TAT), Johnston's (1957) Iowa Picture Interpretation Test (IPIT), Edwards' (1954) Personal Preference Schedule subscale for n Ach (EPPS), French's (1955) Test of Insight, Steers and Braunstein's (1976) Manifest Needs Questionnaire (MNQ), and Hermans' (1970) Prestatie Motivatie Test (PMT).

Early work on the relationship of the achievement motive to task performance was reviewed by Atkinson (1958). For example, French (1955) studied 90 male students at an Air Force Officer Candidate School. Strength of achievement motive, as measured by her projective Test of Insight, was positively related to performance on a digit-letter substitution task. In another study, French (reported in Atkinson, 1958, pp. 400-408) found a main effect for the achievement motive on task performance that was independent of two other variables being manipulated (availability of performance feedback and individual versus group problem solving orientation).

This study was based on 256 airmen trainees and a task that involved the reconstruction of short stories from component sentences placed on cards.

Using an arithmetic problem solving task, Atkinson and Reitman (1956) found TAT scores of n Ach were positively associated with number of problems attempted (an impure measure of motivation) and number correctly solved (a performance measure) for 96 college students. A secondary analysis of 58 subjects who had Quantitative Aptitude scores from the American Council of Education Test (ACT) revealed that significant relationships between TAT scores and the two criterion measures existed only for low arithmetic ability subjects.

Heckhausen (1967, pp. 132-140 especially) summarized many studies relating the achievement motive to task performance that were conducted before 1967. Atkinson and Feather (1966) reviewed much of the same literature. Taken together, the collective conclusion that emerges from these reviews of early studies is that fair support exists for the proposition that individuals' task performances are related to the strength of their achievement motives.

This author concurs with Atkinson and Feather (1966) and Heckhausen (1967) that the relationship may be best explained in terms of the impact of the achievement motive on task motivation and the concurrent influence of that motivation on performance.

Recent studies of the achievement motive have favored questionnaire measures over projective techniques. Hermans (1970) compared his Prestatie Motivatie Test (PMT), a questionnaire measure, to McClelland et al.'s (1953) TAT, a projective device, in two different studies. For subjects in a neutral control condition of the first study, no relationships were found between either measure of the motive and later performance on a pursuit rotor task. However, in a condition created by giving subjects "achievement-arousing" instructions, the PMT measure predicted performance two weeks later (r = .37, p < .05), whereas the TAT did not (r = -.10, n.s.).

The second study compared the PMT and TAT for their utility in predicting the academic effort and performance of Dutch college students. Academic effort (another indirect measure of motivation) was measured by the number of exams students in an unstructured curriculum took during a given time period. Performance was taken as the exam grades received by students in both structured and

unstructured curricula. For students in unstructured study programs, the PMT predicted both effort (r = .57, p <.01) and performance (r = .34, p <.05), whereas the TAT showed no relationship to either criterion measure. Neither the PMT nor the TAT showed any relationship to performance for students in structured study programs. Hermans (1970) concluded that his results were consistent with Klinger's (1966) hypothesis that projective measures of the achievement motive have little performance-related validity for people of college or adult age.

Steers (1975a, 1975b) used Gough and Heilbrun's (1965) Adjective Check List (ACL) measure of the achievement motive in a study of 133 first-level female supervisors in a large public utility company. Supervisors' ratings of overall performance and effort were both correlated with the n Ach measure (r = .15, p <.05 and r = .32, p <.005, one-tailed tests; respectively). Furthermore, the ACL measure of n Ach was related to self-reported job involvement as measured by Lodahl and Kejner's (1965) instrument (r = .22, p <.01, two-tailed test). These results are especially interesting for they were based on data collected in a field setting from an all female sample. Many of the earlier studies were conducted on college students in the laboratory.

Furthermore, some authors had questioned whether findings regarding the achievement motive could be generalized to women (e.g., Atkinson, 1958; Stein & Bailey, 1973).

Cummin (1967) dichotomized a sample of 52 businessmen into more and less successful subgroups on the basis of median salary of the whole sample. Chi-square tests of association showed TAT measures of the achievement and power motives (McClelland et al., 1953) were both positively associated with success at $p < .01$. Similarly, McClelland (1965) presented evidence that n Ach is associated with "entrepreneurial success" in several parts of India, and Litwin (Note 3) reported the relationship of achievement motivation to the business success of sales personnel.

Although the achievement motive has occasionally failed to show a relationship to task performance (e.g., Bendig, 1958; Caron, 1963; Mitchell, 1961), the many positive findings indicate that the motive warrants more attention from industrial psychologists than it has heretofore received. In light of suggestions that variables such as locus of control may moderate the influence

of the achievement motive on work motivation and performance (Deci, 1975; Rotter, 1966), future research efforts should make serious attempts to examine such potential moderator variables. Such a multivariate approach may improve our understanding of the processes underlying the achievement motive's relationship to performance.

Internal-External Locus of Control

Deriving from the work of Heider (1958) on the "locus of causality," Phares' (1957) study of skill versus chance situations, and his own work in social learning theory (Rotter, 1954), Rotter (1966) introduced the locus of control concept as follows:

> When a reinforcement (or event) is perceived by the subject as following some action of his own but not being entirely contingent upon his own action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When an event is interpreted in this way by an individual, we have labeled this a belief in external control. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in internal control. (p. 1, italics in original).

It should be noted that Rotter defined locus of control in terms of perceptions about a single event. He emphasized this situational specificity aspect of the concept repeatedly when he pointed out:

> The other limitation is one of specificity in that internal-external control attitudes are obviously not generalized across the board. (Rotter, 1966, p. 21)

> Not only do subjects in general differentiate . . . situations as internally or externally determined but individuals differ in a generalized expectancy in how they regard the same situation. (Rotter, 1966, p. 25)

Yet, a perusal of the literature reveals that many researchers have unwittingly viewed locus of control as an omnibus trait, similar to "intelligence" in its scope, which pertains to each and every facet of human endeavor (Lefcourt, 1976). Possible reasons for this general misunderstanding of the concept's situational specificity could be:

(a) Rotter (1966) titled his original monograph "Generalized Expectancies for Internal versus External Control of Reinforcement," thus emphasizing a cross-situational propensity.

(b) Rotter developed his popular "I-E scale" to reflect some global composite of locus of control perceptions that is insensitive to situational differences.

(c) A common paradigm for investigating the concept has evolved such that studies typically adopt an additive (or "main effects") model, use Rotter's I-E or some other global measure, and attempt to predict some situationally specific measure of motivation or performance with it.

In spite of the obvious weaknesses inherent in an approach which uses a general trait measure like the I-E scale to predict behavior in a given situation (Bowers, 1973; Mischel, 1968), empirical findings have often supported the hypothesis that an internal locus of perceived control over events has a positive influence on task motivation and performance.

Academic motivation and performance have been the criterion variables that have received the most attention from researchers. For example, Lessing (1969) used Strodtbeck's (1958) Personal Control Scale to study a sample of eighth and eleventh graders. Even after intelligence had been partialled out, grade point averages retained a significant correlation with "internality." Franklin (1963) found a positive association between internality and the time spent by high school students on homework (an impure

measure of motivation). Similarly, James (Note 4) reported that "internal" students were more persistent in tasks requiring answers to complex logical puzzles than externals. However, Eisenman and Platt (1968) and Hjelle (1970) found no significant relationships between locus of control and academic achievement in their studies.

A few field studies have looked at locus of control. Based on data collected from the National Longitudinal Surveys of labor market experience, Valecha (1972) and Andrisani and Nestel (1976) found internality, assessed with Rotter's scale, was correlated positively with occupational status, occupational information, career advancement, job autonomy, hours worked per week, hourly earning, yearly earning, job satisfaction, and involvement in adult continuing education programs.

Broedling (1975) used the I-E scale in a study of 207 enlisted personnel and officers in the U. S. Navy. She found internality was positively related to the expectancy theory concepts of valence (outcome attractiveness), instrumentality (degree to which a given outcome is contingent on job performance), and expectancy (confidence

in one's ability to achieve a given standard of performance). More importantly, internality was positively correlated with supervisor's ratings of work effort (r = .20, p <.05) and performance (r = .19, p <.05), and peers ratings of performance (r = .17, p <.05). Similar to Valecha (1972), Broedling also reported that internality was related to pay grade (or rank).

Wolk and DuCette (1973) reasoned similarly to Deci (1975) and Rotter (1966) that an internal locus of control is a prerequisite for a strong relationship between the achievement motive and its presumed manifestations and influences (e.g., moderate risk-taking, better performance, stronger motivation, etc.). In the first of two studies they conducted, 53 college students were dichotomized into two subgroups, internals and externals, on the basis of their scores on Rotter's I-E scale. Correlations were computed for each subgroup and the total sample between scores on Mehrabian's (1968) measure of the achievement motive and two criterion measures (subjects' preferences for pursuit rotor tasks of intermediate difficulty and midterm exam grades). The correlations of achievement scores with exam grades were r = .32 (p <.05) for the entire sample, r = .66 (p <.01) for internals, and r = .37 (n.s.) for externals. For the criterion of

preference for tasks of moderate difficulty, the achievement motive showed correlations of r = .02 (n.s.) for the entire sample, r = .53 (p <.05) for internals, and r = -.07 (n.s.) for externals.

In a second study, Wolk and DuCette examined a different sample of 133 students and this time they collected additional data on final exam grades, SAT-verbal, and SAT-quantitative scores. For internals, the achievement motive measure showed positive correlations with midterm exam (r = .39, p <.01), final exam (r = .37, p <.01), SAT-verbal scores (r = .41, p <.01), SAT-quantitative scores (r = .33, p <.01), and preference for tasks of moderate difficulty (r = .44, p <.01). For externals, only the SAT-quantitative scores showed a significant correlation with the achievement motive measure and it was negative (r = -.27, p <.05). Fisher's z tests of the differences between the correlations for internals and externals were significant at or below p = .05 for all criterion measures. For the entire sample, only the final exam and the preference for moderately difficult tasks criteria showed relationships to the achievement motive (r = .18, p <.05 and r = .24, p <.01; respectively). The consistent findings of these two studies led Wolk and DuCette (1973) to conclude that:

> In general, these data indicate that support for achievement-motivation theory can be substantial if the variable of locus of control is taken into account. . . . This study indicates that achievement-related behavior, in

> achievement-motivated subjects, is elicited only when these subjects possess an internal orientation. (p. 67)

With only a few exceptions (such as Wolk and DuCette's study), the predominant paradigm guiding studies of the achievement motive and locus of control concepts has been a bivariate or "main effects" model of the relationship between the focal trait and a dependent variable. That the evolution of such paradigms hampers real scientific progress and understanding has been pointed out before (Cartwright, 1973). Cronbach (1975) and McKeachie (1974) have both asserted that it is time for psychologists to abandon their oversimplified additive or bivariate models and face up to the fact that better understanding of the multidimensional nature of the world will eventuate only if more accurate multivariate models are adopted. Wolk and DuCette's (1973) study clearly demonstrated the value of a multivariate interactionist approach to the study of the locus of control and achievement motive constructs. Future investigators of these concepts should take note of Wolk and DuCette's findings and adopt models that are appropriate to the nomological network under study.

Researchers should also become aware of the situational specificity of the locus of control (and possibly

the achievement motive) dimension. It is not a unitary trait that is invariant within a person regardless of environmental context. The skilled craftsman may perceive a strong internal control over the events and outcomes in his workshop; however, his perceived control over the outcomes of his behavior in the gambling casinos of Las Vegas is probably quite the opposite. Current omnibus measures, such as Rotter's I-E scale, attempt to measure some theoretical mean or average of the various specific control beliefs that a person might have. Hence, such measures probably provide only weak predictive power in specific situations where intra-individual variability in control beliefs is likely to be great. This criticism may be applicable to the majority of achievement motive measures also. Measures specifically designed for the prediction setting are needed.

Lefcourt (1976) recently completed a comprehensive review of the literature on locus of control. His concluding remarks emphasized the need for more situation-specific measures of control:

> If one were to summarize the current status of assessment tools used in the study of locus of control, it would be possible to conclude that there is evidence to encourage investigators to . . . develop newer, more criterion-specific measures. (p. 137)

> Furthermore, if one wishes to use the perception of control as a powerful predicator, then it will <u>always</u> be profitable to design one's own assessment devices for the criterion of interest. This is similar to stating that people are not so much to be characterized as internals or externals as they may be said to hold internal and external control expectancies about different aspects of their lives. If one were concerned about a particular aspect, such as the ability to maintain close intimate relationships, then the perception of control of love and affection responses would be more salient than would control expectancies pertaining to achievement. To summarize this point, one would always do well to add an "of what" after the phrase perception of control. (pp. 153-154, italics added)

Bureaucratic Values

The notion that people have attitudes or sets of values that are pro- or anti-bureaucratic in nature and that influence their work motivation is relatively new. Sociologists (e.g., Bennis, 1969; Blau & Scott, 1962; Bordua & Reiss, 1966; Gouldner, 1954; Merton, 1940; and Selznick, 1943) recognized the impact of organizational bureaucratization on members' work behaviors long ago; however, little study has been made of the influence that individuals' value orientations toward bureaucracy may have on their work motivation. Yet, as Gordon (1973) has suggested:

> Because of the current prevalence of bureaucratic organizations, the identification of individuals who are particularly adapted to this type of work environment is a matter of practical concern. (p. 3)

A version of the general proposition known as the "congruence hypothesis" (Gordon, 1973) states that a person's values regarding bureaucracy interact with perceptions of the bureaucratic orientation of the work environment to influence work motivation. Negative affective reactions are expected to result from value conflicts between a person and the work environment. These conflicts probably lead to depressed work motivation and psychological withdrawal from the job (Gordon, 1973). This motivational effect is likely to be reflected in performance differences over time for a given person or between people at a given time.

Where the bureaucratic orientations of individuals and their work environments are compatible, people should be able to function optimally in seeking to satisfy their competence-related motives. Thus, the orientation of the work environment may be thought of as facilitating or blocking individuals' attempts to act in accordance with their values. This hypothesis is a specific corollary of the more general hypothesis addressed by researchers -

concerned with role theory (e.g., Gross, Mason, & McEachern, 1958; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Morse & Lorsch, 1970; and Sarbin & Allen, 1968); however, it focuses solely on the concept of bureaucratic values and not on the omnibus collection of values represented in the role construct. Analogous to Steers and Spencer's (1977) argument concerning the achievement motive in relation to the more general construct of higher order need strength, the position of this author is that a better understanding of work motivation processes may depend on a redirection of research efforts to focus on the specific components of complex constructs (e.g., bureaucratic values as one component of the work role construct).

Gordon (1973) developed ". . . a set of categories parallel to those of Weber (1922) but describing individual rather than organizational characteristics." (p. 3). These categories or dimensions thus provide a description of individuals with pro-bureaucratic orientations:

self-subordination - a willingness to comply fully with the stated wishes of a superior and to have decisions made for one by higher authority.

impersonalization - a preference for impersonal or formal relationships with others on the job, particularly with individuals at a different organizational level.

rule conformity - a desire for the security afforded by adherence to rules, regulations, and standard operating procedures.

traditionalism - a need for the security provided by organizational identification and conformity to the in-group norm.

compartmentalization - complete confidence in expert judgment, and a need to restrict one's concern to a narrow area of specification.

(Gordon, 1973, pp. 3-4)

Gordon (1973) also developed a 24-item questionnaire, the Work Environment Preference Schedule (WEPS), to measure these human value orientations toward bureaucracy. Research studies that have used the WEPS scale are reviewed

by Gordon (1973). For example, the Conformity and Orderliness scales of the Survey of Interpersonal Values (Gordon, 1960) were correlated positively and the Independence and Variety scales were correlated negatively with the WEPS across samples of Peace Corps volunteers, military trainees, skilled trades apprentices, and college students. Similarly, Gordon (1973) reported that the WEPS has shown positive relationships with measures of authoritarianism (Adorno, Frenkel-Brunswick, Levinson, & Sanford, 1950), dogmatism (Rokeach, 1960), religious conservatism, and internal locus of control (Couch, Note 5).

Kavanagh (1973) examined the WEPS in relation to four scales from the "ideal form" of the Leader Behavior Description Questionnaire (Stogdill, 1963). Based on 111 management students, the WEPS was correlated positively with subordinates' desire for superiors who exhibit Initiation of Structure and Production Emphasis, and negatively with desire for superiors who manifest Tolerance of Freedom and Consideration.

Three studies of ROTC and military academy students indicated that the WEPS was a useful predictor of turnover and dropout in these highly bureaucratic learning

environments (Gordon, 1973). Studies of petroleum products salesmen and hospital support personnel show negative correlations between the WEPS scores and performance ratings. In general, the WEPS seems to be correlated negatively with educational level and measures of intellectual aptitude and positively with age and years of service (Gordon, 1973). To this author's knowledge, only one study (Parkington, Note 6) has looked at the bureaucratic congruence hypothesis as a motivational determinant.

Parkington (note 6) hypothesized that employees in service organizations who perceive themselves as anti-bureaucratic ("enthusiastic") and their organizational environment as bureaucratic will be (1) more dissatisfied with their work organization, (2) more frustrated with their jobs, and (3) more likely to manifest a propensity to quit their jobs. In a study of 263 bank clerical employees, Parkington (Note 6) found that the perceived discrepancy between an individuals' and his organization's bureaucratic orientations was related to work satisfaction ($\underline{r} = -.30$, $\underline{p} < .001$), work frustration ($\underline{r} = .27$, $\underline{p} < .001$), and propensity to leave the organization ($\underline{r} = .27$, $\underline{p} < .001$). Another analysis of the data revealed that the discrepancy between orientations was a better predictor of these criteria than the simple perception of organizational orientation.

While only the Parkington (Note 6) study has investigated this proposition, the bureaucratic congruence hypothesis has intuitive appeal and should be examined by future research. Furthermore, the logic of the congruence hypothesis may be applicable to concepts other than bureaucratic values. The achievement motive and locus of control dimensions may also be thought of as traits or values that interact with the work environment to influence motivation and performance. In the next chapter, this possibility of interactions between achievement motivation and locus of control on one hand, and various environmental characteristics on the other, will be discussed and relevant studies reviewed.

III. ON THE PERSON-SITUATION INTERACTION AS A DETERMINANT OF WORK MOTIVATION AND PERFORMANCE

The Person-Situation Interaction

The theoretical foundation for the tenet that motivation (or behavior) is a result of an interaction between human attributes and situational characteristics has been credited by Endler and Magnusson (1976) to Kantor (1924). Kantor suggested that the appropriate unit of study for psychology was:

> . . . the individual as he interacts with all of the various types of situations which constitute his behavior *circumstances*. (1924, p. 92)

Later, Murray (1938) presented the first modern interactionist theory of behavior in his conceptualization of needs, presses, and themas. Although some consider Murray to have been a "trait theorist" due to his typology of 20 different needs, his concepts of an alpha press (environmental characteristics as they objectively exist in reality) and beta press (situational characteristics as they are subjectively perceived by a person) exemplified his concern for situational factors.

Murray advocated the use of parallel constructs for conceptualizing people and situations and coined the term "themas" to refer to need-press pairs that are based on parallel core dimensions. For example, the achievement thema referred to the interaction of a personal variable (the need for achievement) and a situational variable (environmental "presses" for achievement behavior). In discussing themas, Murray regarded beta presses to be of greater psychological importance than their alpha press complements. Lewin (1951) similarly favored an approach that utilized parallel conceptual dimensions for classifying people and situations; however, Lewin assumed that the alpha press could be ignored. On the other hand, Murray (1951) considered discrepancies between alpha and beta presses to be intriguing and potentially important phenomena.

Contemporary theorists have continued to emphasize the greater potency of the subjectively perceived environment (e.g., Bowers, 1973; Endler & Magnusson, 1976; James, Hater, Gent, & Bruni, Note 7 ; Schneider, B., Note 8; Schneider, D. J., 1973; and Taguiri, 1968). Just the same, a few writers favor the study of the objective dimensions of situations

(e.g., Barker, 1965; Sells, 1963). Several different terms have been used to distinguish these two approaches: biological vs. psychological (Kantor, 1924), geographical vs. behavioral (Koffka, 1935), structure vs. climate (Schneider, B., Note 8), and objective vs. subjective (Endler & Magnusson, 1976). This diversity of terms and positions can also be found in reviews of the literature on the person-situation interaction (e.g., Bowers, 1973; Ekehammer, 1974; Endler & Magnusson, 1976; Lichtman & Hunt, 1971; Mischel, 1973; Pervin, 1968; and Schneider, B., Note 9). In spite of the great variety of interactionist positions, a few fundamental axioms seem to tie together most recent work. According to Endler and Magnusson (1976):

> Conceptions of recent formulations of interactional psychology can be summarized by four main points:
>
> 1. Behavior is determined by a continuous process of interaction between the individual and the situation he encounters (feedback).
> 2. The individual is an intentional, active agent in this interaction process.
> 3. Cognitive factors are important in interaction.
> 4. The psychological meaning of the situation to the individual is an essential determinant of behavior. (pp. 11-12)

The study of person-situation interactions has encompassed several different lines of inquiry. One line of investigation has focused on interactions between human aptitudes or abilities and certain contextual variables such as task characteristics, reward systems, and work climate (e.g., Schneider, B., Note 9). Another approach has emphasized human personality traits and values in interaction with situational variables (e.g., Endler & Magnusson, 1976). Within each of these two approaches, one can distinguish studies which look at the behavioral consequences of interaction from studies that focus exclusively on emotional or motivational effects (e.g., satisfaction, turnover intentions, etc.). For present purposes, only those studies that have focused on the interaction of values or traits and the work environment are of direct importance. Furthermore, studies within this domain which have considered the achievement motive or locus of control variables are especially relevant. In the next section, several studies that fall within these constraints are discussed. The final section of this chapter contains a comment on the present state of research in this area.

Some Exemplary Research

One of the most respected investigations of the person-situation interaction is the A.T.&T. study of managerial potential and success (Bray, Campbell, & Grant, 1974). Although this study has involved many different types of measures collected over a period of years, the finding of primary interest here was that an overall prediction of success (whether a person is likely to reach the middle level of management in ten years or not) was differentially valid depending on the degree of challenge experienced during the initial years of the job.

The predictor (a dichotomous judgment) was based on a clinical integration of information from interviews, projective personality tests, aptitude and ability measures, assessment center exercises, etc. An analysis of the relationships between various achievement motive indices and the global predictor rating indicated that achievement-oriented values had "heavy loadings" on the rating. To the degree that the prediction of success was determined by achievement motivations, the interaction of the overall rating with job challenge in predicting actual management level attained may be taken as evidence

for an interaction between achievement motivation and job challenge. Direct tests of this latter interaction would have been desirable for this paper's purposes; however, Bray et al. (1974) did not report these analyses. Nevertheless, the results they do report provide some support for the influence on career success of an interaction between achievement motivation and early job challenge.

Andrews (1967) studied career advancement as a function of the fit between employees' and their work organizations' predominant value orientations. Two very different Mexican firms were examined. One firm was described as:

> . . . highly achievement oriented, progressive and expansive in its policies, and economically successful. . . . Many people respond to this challenge, and those who do not are replaced or . . . given help, if possible, through the counselling services. (Andrews, 1967, p. 164)

The other firm was quite different:

> . . . less achievement-oriented, more conservative and traditional, and less successful economically. . . this second firm is strongly oriented toward power relationships, shows few achievement-oriented characteristics and is more strongly oriented around issues of dominance and dependence. (Andrews, 1967, pp. 164-165)

Andrews hypothesized that advancement in either firm (e.g., promotions, pay raises, job status) depended on a congruence between individuals' motive strengths and their firm's dominant orientation. TAT measures of n Achievement and n Power, as well as criterion measures of advancement, were obtained from personnel in both organizations. Results generally showed that the achievement motive was positively related to advancement in the achievement-oriented firm and negatively related to advancement in the power-oriented firm. Furthermore, the power motive showed positive correlations with advancement in the power-oriented firm and negative correlations in the achievement-oriented firm.

In a laboratory experiment conducted at a Japanese university, Misumi and Seki (1967) obtained TAT measures of the achievement motive from a sample of college students. Twelve students who were high and twelve who were low in achievement motivation were selected. Each group of twelve was then divided into four subgroups which were randomly assigned to one of four different supervisory style treatments: performance emphasis, consideration emphasis, performance and consideration emphasis, and a neutral

emphasis (control group). Graduate assistants served as work group supervisors to implement the desired styles. Each group worked for nearly two hours on a task that involved counting the holes in computer cards.

A 4 X 2 analysis of productivity variance showed main effects for supervisory style ($p < .05$), and achievement motivation ($p < .001$), as well as the interaction between them ($p < .001$). For groups with high achievement motivation, the order of treatment cell means from highest to lowest performance was: consideration and performance, performance, consideration, and neutral conditions. For low achievement motivation groups, treatment cell means decreased in the order: performance, control, consideration and performance, and consideration conditions.

Steers (1975a, 1975b) and Steers and Spencer (1977) provided results from several studies demonstrating the interaction of achievement motivation with work environment variables and with other personal dimensions. In one study of 133 first-level female supervisors in a large utility company, Steers (1975a) found that for those

with low achievement motivation, their perceptions of the degree of participation they experienced were positively correlated with superiors' rating of work effort and performance. For the women with high achievement motivation, this relationship was not obtained. However, for these high achievement-motivated supervisors, their reports of the amount of performance feedback they received and the specificity of their work goals were both positively related to work effort and performance. On the other hand, no relationships between these measures were observed for low achievement-motivated supervisors.

In another study of the same sample, Steers (1975b) obtained self-report measures of job involvement and job satisfaction. For subjects with weak achievement motivation, neither involvement nor satisfaction were related to performance. However, for subjects with strong achievement motivation, both involvement and satisfaction were positively correlated with superiors' ratings of the subjects' performance.

Steers and Spencer (1977) studied 115 managers in a major manufacturing firm. They hypothesized that managers' perceptions of job environmental scope (i.e., task variety, autonomy, identity, feedback, optional and

required social interactions) would be related to job performance ratings only for those with strong achievement motivation. Correlations between all the job scope dimensions but one (required social interactions) and performance were positive for high achievement-motivated managers and significantly different from the correlations computed on managers with weak achievement motivation.

A moderated multiple regression analysis of the performance variance showed that after the overall job scope predictor was in the equation (R_{y1} = .11, n.s.), the increase in predictability of performance due to the addition of the achievement motive variable was significant (R_{y12} = .22, $p < .05$), as well as the subsequent increase due to the interaction term between job scope and achievement motivation (R_{y123} = .26, $p < .10$). The results of this study and the previous two (Steers, 1975a, 1975b) serve to emphasize the point that:

> . . . the n Ach construct warrants further consideration as an important individual difference variable in future investigations of employee motivation and work behavior. (Steers & Spencer, 1977, p. 478)

Pritchard and Karasick (1973) hypothesized similar to Andrews (1967) that:

> . . . organizational climate interacts with such individual differences variables as needs or values in influencing behavior. (p. 127)

Forty-six managers were selected from a franchising firm that was described as ". . . dynamic, democratic, skilled in handling operating problems, aggressive, and highly achievement oriented" (Pritchard & Karasick, 1973, p. 130). Another thirty managers were selected from a manufacturing company that was ". . . centralized, static, conservative, and paternalistic in nature" (p. 130). All subjects completed an organizational climate questionnaire containing 11 scales measuring perceived autonomy, conflict v. cooperation, social relations, structure, levels of rewards, performance-reward dependency, motivation to achieve, status polarization, flexibility and innovation, decision centralization, and supportiveness. The managers also completed five scales from Edwards Personal Preference Schedule (achievement, affiliation, autonomy, order, and dominance) and the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1967).

Tests of differences between personnel from the two organizations on the climate scales showed that the

dynamic company was perceived to have better social relations, a stronger performance-reward dependency, more flexibility and innovation, and a stronger achievement orientation. The static organization was perceived to have greater decision centralization and status polarization. Of the 11 climate scales, the perceived achievement-orientation scale had the highest correlation with ratings of managers' performance ($\underline{r}$ = .25, $\underline{p} < .05$) and the second highest correlation with their reported job satisfaction ($\underline{r}$ = .65, $\underline{p} < .01$) for a combined sample from both organizations.

The combined sample was trichotomized into high, medium, and low groups on individual need and climate dimensions and 3 X 3 analyses of variance were computed for the performance and satisfaction measures. No significant interactions between need achievement and climate achievement were obtained for either measure; however, Pritchard and Karasick (1973) noted that:

> . . . some support for an interactive relationship was observed by the extremely low mean satisfaction level of the High individual need for achievement-Low climate achievement subjects. (p. 139)

Significant interactions were obtained for the climate status polarization-need dominance combination with performance ($p < .06$) and with satisfaction ($p < .01$) and for the climate decision centralization-need autonomy combination with satisfaction ($p < .05$).

The foregoing studies provide findings that suggest the possible utility of considering person-situation achievement interactions in work motivation research. Although few studies of interactions between personal and situational locus of control have been made, some relevant findings are available.

Runyon (1973) predicted that:

> The more individuals see themselves as internals, the greater will be their satisfaction with participative management and vice versa. (p. 289)

He also hypothesized that:

> The more closely supervision approaches participative management, the greater will be the job involvement of individuals who see themselves as internals. (Runyon, 1973, p. 289)

Rotter's I-E scale, Lodahl and Kejner's (1965) job involvement scale, and a likert-scale that measured satisfaction with supervision were administered to a sample of 54 hourly

employees of an urban chemical company. Another sample of 56 employees having the same supervisors as those in the first sample were given a seven item scale that measured their supervisors' style of management along the participative dimension. Data points were developed by matching employees from the two samples into pairs who had the same supervisor to give a total sample size of 54 pairs. The sample was divided into six groups by dichotomizing on the supervisory style measure into "participative" and "directive" styles and trichotomizing on the locus of control measure into internal, intermediate, and external orientations.

A 2 X 3 analysis of variance on the satisfaction with supervision measure showed a main effect for style ($p < .01$) and a significant interaction between style and locus of control ($p < .001$). An examination of cell means revealed that participative groups exhibited greater satisfaction than directive groups. Furthermore, satisfaction covaried positively with internality under participative supervision and negatively with internality under directive supervision.

An analysis of job involvement variance using the same 2 X 3 desigr. produced a strong main effect for locus of control ($p < .001$), a weaker main effect for s upervisory style ($p < .08$), and no interaction. To the extent that job satisfaction and involvement are reflective of work motivation, this study's findings support an explanation of work motivation as a function of the interaction between personal and situational locus of control.

Organ (1975) administered eight unannounced bonus quizzes to three classes of graduate students during a semester. Midway through the semester, data were collected from the students on Rotter's I-E scale. Internality correlated positively ($r = .13$, $p < .05$, one-tail test) with the total bonus points earned on these quizzes, but not with performance on regularly scheduled exams. Subjects ($n = 142$) were dichotomized at the median on the locus of control measure and the two groups were compared on the average improvement in their quiz performances over time. Whereas internal subjects showed a significant improvement, externals did not. Organ (1975) interpreted these results in line with a person-situation interaction explanation:

> . . . internals did show a significantly greater rate of improvement on bonus quiz performance. This supports and extends previous findings that internals are more sensitive than externals to opportunities for reinforcement. However tentative and limited the conclusions one may draw from these results, the findings would appear to encourage the search for stable, generalized individual differences that moderate the effects of organizational environments. (p. 404)

Rotter and Mulry (1965) presented college students in a laboratory experiment with sets of plane angles and instructed them to choose the one angle in each set that was most similar to a given criterion. Although all angles in a given set were equal and thus there was no correct answer, subjects were not told this. The dependent variable was the time subjects spent trying to decide which alternative was better (an impure assessment of motivation).

Internals and externals were randomly assigned to either a skill (subjects were told that success depended on skill) or chance condition (subjects were told that the task was so difficult that success depended primarily

on luck). The interaction between locus of control and skill versus chance instructions was significant by an analysis of variance procedure ($p<.05$). The authors interpreted their findings to mean that internals tend to become more involved in tasks if they perceive success to depend on their own skills.

The results of Organ's (1975) and Rotter and Mulry's (1965) studies are supportive of the hypothesized interaction of locus of control and work context variables, but only Runyon's (1973) study directly addressed the issue in a field setting. It seems clear that more attention should be given to the locus of control construct in future field investigations of work motivation and performance.

A Comment on the Methodology of Interactions

The notion that work performance is a function of ability, motivation, and their interaction has been popular for many years now. Just as popular has been the Lewinian tenet that work motivation is a function

of the person, the work environment, and their interaction. Many researchers have sought to investigate one or the other of these hypotheses; some have investigated the two concurrently which is most desirable. Although the theoretical framework for understanding the interactional processes of work motivation and performance was laid down some time ago, only recently have researchers become aware of statistical tools appropriate for dealing with multivariate data involving interactions.

As the reader may have noticed, the majority of interaction studies reviewed here used one of two different statistical techniques. One common technique is differential subgroup analysis. This procedure involves dividing the sample into subgroups on the basis of scores or standings on a potential moderator variable. Correlations computed within each subgroup between "independent" and "dependent" measures are then tested to see if they differ significantly across subgroups. Although this method is valid for certain purposes, such as determining whether a linear relationship

between two variables is stronger in one subgroup than in another, it has often been misinterpreted (Zedeck, 1971).

For example, McNemar (1969) pointed out that the discovery of different correlations across subgroups does not always mean that the errors of prediction are different. Similarly, Bartlett (Note 10) has noted that correlation coefficients depend on means and standard deviations as well as raw regression slopes. Thus, the finding of different subgroup correlations does not directly imply the presence of different subgroup means, standard deviations, or slopes (and vice versa). Other possible problems with this technique involve determining the optimal number of subgroups to be formed, placement of cutting scores for distinguishing subgroups, and deciding on an appropriate definition of differential validity.

Classical analysis of variance (ANOVA) represents the second commonly used method for determining interaction effects. Whereas differential subgroup analysis tests for correlation differences, the ANOVA procedure is concerned with the pattern of differences among

subgroup means. If the underlying assumptions of the ANOVA are satisfied, it does provide valid tests of interactions among the factors represented. However, for many of the non-experimental studies reviewed earlier, the ANOVA assumptions were violated by the procedure used for creating "treatment cell" subgroups.

For example, several studies divided their samples into subgroups of approximately the same size on the basis of scores from obtained measures. The measures were then treated as "experimental factors" and the subgroups were taken to represent "levels" of these factors. The ANOVA procedure is subsequently applied to these subgroups or "treatment cell samples" to test for interactions between the measures.

Although this procedure shows an appreciation for the "homogeneity of error variance" assumption underlying analyses of variance, it violates the more critical assumption of randomness of the errors both within and across cells. Because subjects are not randomly assigned to the various treatment combinations, any

dependence that may exist among the measures or "factors" in the population will carry over into the sample. This dependence among the "factors" results in dependence of the errors within and across subgroup "treatment cells." In this context, Hayes (1973) has warned:

> The assumption of independent errors is most important for the justification of the F test in the analysis of variance, and unfortunately, violations of this assumption have important consequences for the results of the analysis. If this assumption is not met, very serious errors in inference can be made. (p. 482, italics in original)

Moderated multiple regression analysis (MR) has recently been promoted by several writers (e.g., Cohen & Cohen, 1975; Zedeck, 1971) as a more appropriate procedure for investigating interactions among non-experimental data. Several of its more obvious advantages include: (1) mechanisms for dealing with moderate multicollinearity among variables, thus avoiding the ANOVA problem of nonorthogonality produced by unequal sample sizes or dependent errors, (2) utilization of the full range of data, thus avoiding the loss of information, metric precision, and statistical power produced by subgrouping, (3) it not only provides appropriate significance tests

of interaction that are invariant under linear transformations of the simple variables, but also estimates of the usefulness and relative sizes of the effects, and (4) it provides for the inclusion of higher order terms and interactions so that nearly any nonlinear effect of interest can be examined.

The MR approach is based on the general linear model. The variance of some "dependent" variable, Y, is assumed to be uniquely partitionable and allocatable to several "independent" variables, X_i, and to a random error component, E_{ij}. In connection with the ability-motivation interaction hypothesis, three "independent" variables representing some measure of ability (A), some measure of motivation (M), and their product (A*M) are included in the model. MR provides an unbiased test of the "main effect" of either the ability or the motivation variable by testing the increment in $\underline{R}^2$ due to the addition of the variable to the equation after the other is already in. Similarly, the increment in $\underline{R}^2$ due to the addition of the product term (A*M) to the main effects (A, M) provides an unbiased test of the interaction

between the ability and motivation measures. This heirarchical strategy also has the advantage of providing tests that are invariant to linear transformations of the original measures (Cohen & Cohen, 1975).

The moderated multiple regression analysis is a powerful and flexible tool for the non-experimental researcher who is interested in interactions. There have been many studies that may have benefitted from the increased power of the MR analysis relative to the ANOVA. The availability of computer programs for conducting MR analyses and several textbooks which discuss its applicability to a wide range of research problems (e.g., Cohen & Cohen, 1975) should stimulate increased use of the procedure.

IV. SUMMARY AND HYPOTHESES

Overview

In Chapter I, the proposition that work performance is determined by ability, motivation, and their interaction was reviewed. A plethora of studies (see Howard, Note 2) have employed a variety of measures to investigate this hypothesis. In most studies, the selection of appropriate ability measures has been an area of little theoretical dispute. Such decisions have usually been determined by the apparent skill requirements of the task. However, in some studies, researchers have been constrained to use whatever seemed to be the best of several available, but inferior measures of ability.

Selecting meaningful measures of work motivation has always been an area plagued by conflicting theoretical perspectives on the nature and measurement of work motivation. Thus, one finds the literature replete with many different measures of work motivation which reflect a variety of conceptual orientations.

These orientations seem to fall into three general categories: person-oriented, situation-oriented, or person-situation interaction-oriented. In Chapter II, three personal trait dimensions (locus of control, achievement motivation, and bureaucratic values) which may be important for understanding work motivation and performance were discussed in the context of a person-oriented approach. Departing from this approach, Chapter III introduced the idea that work motivation and performance may be better explained by person-situation interactions.

Based on the early work of Lewin (1938), the person-situation interaction approach posits that the motivational force on a person to act is determined by attributes of the person, of the environment, and their interaction. In light of the research and ideas presented in Chapters II and III, it seems reasonable that the personal attributes of achievement motivation, locus of control, and bureaucratic values may interact with the work environment to affect work motivation and performance.

Some studies have found that objective aspects of the work setting may interact with these traits to affect motivation and performance (e.g., Andrews, 1967). Just the same, this author concurs with the view of several theorists (e.g., Endler & Magnusson, 1976; James et al., Note 7) that it is a person's subjective impression of the work environment that probably has the most direct interaction with personal traits. Because people are not comprehensive, unbiased information processors, they are likely to interpret similar work environments differently and the correspondence between objective and subjective environments may be less than perfect. For this reason, the subjective work environment may be a more powerful factor than the objective environment in studies of the person-situation interaction.

Whereas statistical interactions between personal traits and situational characteristics have been and can be empirically demonstrated in the work setting, the existence and nature of the psychological processes likely to be responsible for these observed interactions are a matter for theoretical speculation. The position favored by this author is derived from the general congruence

hypothesis. Specifically, this position states that a person's work-related traits and values have an effect on work motivation that is moderated by the compatibility of the values with similar dimensions in the perceived work environment. To the degree that the subjective work environment manifests characteristics congruent with (i.e., facilitative of) a person's work-related traits and values, the more likely the person may be to express those traits and values.

Work-related traits and values may have either positive or negative influences on work motivation. Competence-related traits, such as achievement motivation and an internal locus of control, probably always have a positive influence. In the case of bureaucratic values, the causal influence probably varies depending on the nature of the task. For certain kinds of work, such as that of architects which involves creative problem-solving, originality, and freedom of expression, bureaucratic values are likely to have detrimental effects on one's work motivation and performance. However, in many paramilitary organizations, such as

hospitals, police departments, etc., bureaucratic values may be optimally facilitative of motivation for the kind of work faced by employees. To elaborate, the rigid self-subordination and adherence to established routines characteristic of bureaucratic work values may be functional for performing the emergency work done by many paramilitary organizations. For such jobs and vocations, strong bureaucratic values may have positive influences on work motivation and performance.

Based on the foregoing notions, if a person has positive trait orientations toward his work, they are expected to positively influence work motivation and performance only to the degree that the person perceives the work environment in a way congruent with the expression of his traits. For example, given that a person had a strong desire for challenge and competition in his work (i.e., strong achievement motivation), this trait would not have a powerful impact on motivation and performance if the person perceives his work to be boring and routine.

Conversely, given that a person had a strong desire to subvert his work and create dysfunctions (i.e., negative achievement motivation), this trait could not have a strong influence on motivation and performance if the person perceived that the work environment would thwart its expression. Exceptions to these propositions surely occur in actuality; however, they are intended as normitive explanations and should be evaluated only at that level of analysis.

This conceptualization holds that an increased fit between the work-related attributes of the person and those of the perceived work setting will elicit greater work motivation only to the extent that the personal attributes are strong and positively oriented. Thus, a strong compatibility between a person and his work environment should have detrimental effects on motivation if his work-related

traits and values are negative. Mathematically, this model of work motivation can be expressed as follows:

$$M = \sum_{i}^{p} (V_i * C_i) \qquad (1)$$

where $\underline{M}$ is a person's overall work motivation, $\underline{V_i}$ is the magnitude and direction of his work-related value or trait $\underline{i}$, and $\underline{C_i}$ is some index of the compatibility of the subjective work environment with V_i. Although C_i can be operationalized in several ways, a relatively simple expression that is useful where traits and environmental characteristics are measured on similar metric scales is:

$$C_i = k - |V_i - E_i| \qquad (2)$$

Where $\underline{E_i}$ is the perceived strength of the work environment's orientation in a direction that is congruent with or facilitative of V_i, and $\underline{k}$ is a constant used to orient C_i in a direction indicative of increasing fit. In general, k should be greater than or equal to the maximum value that $|V_i - E_i|$ can obtain.

According to equation 1, each distinct V_i makes a contribution to work motivation that depends on its fit

with the perceived environment. Overall work motivation results from an agglomeration of the p different work-related traits or values where each V_i is weighted according to its environmental compatibility. A strong compatibility between a given V_i and the perceived environment does not directly imply a positive influence on motivation because a V_i can be either positively or negatively oriented.

If a person has a trait or value component that is negatively oriented to work (i.e., V_i has a negative magnitude), then a work environment perceived as compatible with that attribute should have a more detrimental effect on motivation than an environment that thwarts expressions of the negative trait or value. Similarly, a work setting perceived to be positively oriented toward work on a certain dimension will facilitate and reinforce positive work attitudes on that dimension and frustrate negative attitudes and expressions.

Performance is hypothesized to result from overall work motivation (M), ability (A), and their interaction

(A*M) as given below:

$$P = A + M + (A*M) \qquad (3)$$

This equation describes a fundamentally additive relationship between a person's ability and motivation and his resultant performance. The inclusion of the interaction term addresses the notion that some interaction probably does occur, especially at the extreme ranges of either ability or motivation (Cummings & Schwab, 1974). Just the same, this interaction is presumed to be minimal in the middle ranges of ability and motivation where the majority of people exist.

Algebraically, the theoretical models represented in these equations portray performance as a function of ability, personal traits and values, and the subjective work environment. This can be seen more clearly by substituting equation 2 into equation 1, and then substituting equation 1 into equation 3 to give:

$$P = A + \left[\sum_{i}^{p}(V_i)\,(k - |V_i - E_i|)\right] + \left\{A * \left[\sum_{i}^{p}(V_i)\,(k - |V_i - E_i|)\right]\right\} \qquad (4)$$

Although rather complicated terms are involved in the expanded version of equation 4, the presence of

triple product terms within the expression enclosed by braces indicates some acknowledgement of a conceptual triple interaction of ability, personal attributes, and the environment in affecting performance. Equation 4 does not represent a triple interaction in the common statistical sense, but it does present a kind of conceptual triple interaction derived mathematically from the models of work motivation and performance given in equations 1, 2, and 3. Based on equations 3 and 4, the following general hypothesis was postulated:

> Hypothesis 1. Work performance should be independently related to a person's ability, overall work motivation as given in equations 1 and 2, and their interaction.

To test hypothesis 1, this study combined measures of the component trait dimensions (i.e., the achievement motive, locus of control, and bureaucratic values) with measures of similar dimensions in the subjective work environment according to equations 1 and 2. This procedure resulted in an index of overall work motivation

for each subject. This index was then combined with ability and performance measures as given in equation 3 and moderated multiple resgression analyses were conducted to test the independent contributions of each term.

All three component traits were expected to make positive contributions to overall work motivation for the sample studied (described in the next chapter). Hence, it was predicted that work motivation indices, computed according to equations 1 and 2 for each trait separately, should show relationships to performance as described in equations 3 and 4. Thus, each of the three traits suggested a specific corollary to hypothesis 1:

Corollary 1A. Hypothesis 1 should hold, even if the work motivation index given by equations 1 and 2 is based solely on <u>achievement motivation</u>.

Corollary 1B. Hypothesis 1 should hold, even if the work motivation index given by equations 1 and 2 is based solely on <u>locus of control</u>.

Corollary 1C. Hypothesis 1 should hold, even if the work motivation index given by equations 1 and 2 is based solely on bureaucratic values.

Obviously, Hypothesis 1 and its three corollaries were not independent predictions in that they all shared some common variance. Just the same, an examination of the three corollaries was undertaken to gather exploratory evidence suggestive of the relative importance of each component trait for understanding work motivation and performance.

The model presented here posits that the traits and work value orientations have predominantly additive effects on motivation and performance. However, Wolk and DuCette (1973) found an interactive effect of achievement motivation and locus of control on performance. There apparently exists no simple way to compare these different approaches. Whereas, the concepts of ability and perceived environment are intimately involved in the equation 4 model, Wolk and DuCette's study did not incorporate these concepts. In any case, this

study provided an opportunity to test the replicability of their findings in a field setting. Thus, the following hypothesis was posed:

> Hypothesis 2. Work performance should be independently related to achievement motivation, locus of control, and their interaction.

The general model presented in equations 1, 2, 3, and 4 provides the researcher interested in work motivation and performance with one framework for generating testable propositions. In this study, the trait concepts of achievement motivation, locus of control, and bureaucratic values were examined in the context of the model. Certainly, there are more trait and subjective context variables which could be studied under the auspices of the model. Empirical findings may show this model to be inappropriate for some traits, some abilities, or some work settings; or, the model may not be supported by any investigation of its predictions. In spite of its tenuous state, it should stimulate the kinds of systematic multivariate investigations which will progress our understanding of work motivation and performance.

V. PROCEDURE

Sample

The sample consisted of 493 police officers from a large suburban county police department. The sample was predominantly composed of White male patrol officers from the lower ranks of the department (privates, privates-first-class, and corporals); however, women and Blacks were also represented.

Ability Measures

Several possible measures of job-related ability were obtained from subjects' personnel files. These included the PPA test, the grade received in the police academy's basic training course, and the score earned on a comprehensive physical fitness report. The PPA test is a general reasoning test that the department used as a preliminary screening device for selecting applicants. While little information concerning the test's validity is available, it was expected to tap important job-related skills.

The physical fitness report was intended to measure some of the critical physical skills demanded of police officers. The basic training grade reflected a variety of skills and abilities deemed to be necessary for effective job performance by the academy instructors.

In the Spring of 1977, the IPMA and Wonderlic tests were administered to this sample. The IPMA test is a general reasoning test developed by the International Personnel Management Association (1974) to replace its earlier police selection device, the PPA. According to an unpublished memo which accompanied the test booklets, "This test is a general instrument to be used in conjunction with other selction devices for selecting the most qualified persons for Police Officer." A study reported by Wollack, Clancy, and Beak (Note 11) found the IPMA test had predictive validity against a composite criterion measure based on multi-dimensional ratings of officers' performance. For White officers, the IPMA had a validity of .14 ($p < .01$). For Black officers, the validity was .38 ($p < .01$).

Apparently, the IPMA was more carefully constructed than its predecessor, the PPA, and was probably one of the better measures of job-related intellectual functioning available on this sample.

The Wonderlic Personnel Test (Wonderlic, 1975) is a short 12 minute test of general intelligence. Whereas the IPMA was specifically designed for measuring the intellectual skills needed by police officers, the Wonderlic was ". . . designed and created for testing adults in business and industrial situations" (Wonderlic, 1975, p. 2). According to the test manual (Wonderlic, 1975), "The Wonderlic Personnel Test has been proven valid in more than 150 separate, independent research studies published by others" (p. 4). Although this claim is impressive, there are probably many personnel researchers who would question the performance-related validity of the Wonderlic for all jobs.

Data were missing from many subjects on several of these measures. Furthermore, a few measures seemed

to tap more important job-related skills and to have more empirical support behind them than others. This situation created a problem in that a single ability measure was desired for testing the hypotheses. The solution adopted was to develop a single a priori composite measure. This composite was formed from a linear combination of the basic training grade, the IPMA, the physical fitness report, and the Wonderlic measures after they were standardized. Where data was missing on a measure, the mean of the non-missing data points was substituted into the composite.

Measures of Traits and Values

A questionnaire was developed to measure the constructs of achievement motivation, locus of control, and bureaucratic values as they apply to work settings in general. In Chapter II, it was argued that available measures of achievement motivation and locus of control are generally too omnibus for ascertaining individuals' values with regard to a specific class of

situations. Similar to Lefcourt (1976), this author believes that there is a need to develop new measures of these constructs which are specific to the class of situation under investigation.

In developing the questionnaire, a critical examination of published measures of achievement motivation (Edwards, 1954; Hermans, 1970; and Steers & Braunstein, 1976) and locus of control (Rotter, 1966) was conducted. Theoretical papers which discussed the defining subdimensions were content analyzed and reviewed. Based on these efforts, items were developed to measure the components which seemed to have important implications in work settings.

In some cases, items from published measures were merely rephrased to achieve the desired focus on work. In other cases, new items were written to tap components of the constructs which seemed particularly relevant to work but were not covered in published measures.

In all cases, attempts were made to produce items which were specific to work settings.

Appendix 1 presents the eight locus of control items and the instructions given to subjects. Each item is composed of two statements presented in a forced choice format. Subjects were requested to choose the one statement in each item that best represented their opinion. Of the two statements in an item, one was written to reflect an external locus of control orientation, and the other, an internal orientation. In Appendix 1, the statements which represent an internal orientation are marked with an "X". In constructing item pairs, an effort was made to phrase alternatives in a way which would make them appear to have equal social desirability to police officers.

Appendix 2 contains the six forced-choice items used to measure achievement motivation. These items were administered under the same instructions as the locus of control items. The statements chosen to reflect a strong achievement orientation are marked with an "X". For the most part, the items were developed as measures of the observable component dimensions

(or distinct manifestations) of the achievement motive as described in Chapter II. As with the locus of control items, an attempt was made to control for differential social desirability within statement pairs.

The 10 Likert-type items shown in Appendix 3 comprised the measure of bureaucratic values. The majority of these items are modifications of items contained in Gordon's (1973) WEPS scale. The WEPS was originally considered for use; however, it contains some items which did not appear to this researcher to be particularly relevant to the police officer's job. Because the three measures of values and traits were expected to be given to subjects in the context of variety of other measures, it was decided to keep the measures as succinct as possible to avoid the effects of fatigue, etc. Just the same, it was believed that the measures were sufficiently comprehensive to tap the most important components of the constructs.

A comment is in order regarding the dimensionality of these measures. Relative to the construct of "higher order need strength," the concepts measured here are relatively specific. However, these three constructs are not presumed to be unidimensional in relation to the work environment. Each construct can be more accurately described as multifaceted with several fairly distinct component dimensions. Particularly with regard to the achievement motive, components reflected in different items range from preferences concerning task difficulty to biases concerning shared responsibility. Where measures are designed to tap multiple dimensions, estimates of internal consistency are not useful indices of reliability because they are expected to be small in magnitude (Cronbach, Gleser, Nanda & Rajaratnam, 1972).

Measures of the Perceived Work Environment

During the testing sessions in which the IPMA, Wonderlic, and the trait measures were administered, subjects completed an 83-item questionnaire survey (Schneider & Dachler, Note 12) of their perceptions of certain aspects of their immediate work environment. Each item required a response on a five point Likert

scale of the frequency with which the item was descriptive of the work setting. Overall, the items focused on many different characteristics of the organization, job, and tasks.

A perusal of the items indicated that many seemed to focus on aspects of the work environment which could be facilitative or obstructive of the traits and values of interest here. For example, an item from the achievement motive scale tapped individuals' desires for self-development and career advancement. Similarly, on the work environment measure, an item asked people to indicate the degree to which "This organization provides employees with the opportunity to develop themselves." To the extent that people with expressed desires for self-development did not perceive the work environment as providing opportunities for this development, it was expected that work motivation and performance would be depressed.

To determine reliable pairings of items from the separate trait and situation measures, five independent judges (including this writer) matched items which

seemed to tap common conceptual dimensions. Items from the measures were retained for analysis only if they were matched consistently by at least four of the five judges. This procedure ensured that inter-judge agreement was 80% or greater. In only a few cases, items could not be found on the work environment measure to match items on the personal traits measures.

Appendix 4 presents items selected from the work environment questionnaire according to the multiple judge strategy. Each item is preceded by one or more symbols in parentheses which indicate the personal trait items matched with it. Thus, if an item is preceded by the symbol A4, this item is matched with the fourth item on the achievement motive scale. Note also, B refers to the bureaucratic values items and IE refers to the locus of control items. Those items in Appendices 1, 2, and 3 that are preceded by an asterisk were not matched with work environment items and did not enter the data analyses.

Because the items in Appendix 4 should have measured different aspects of the environment, the internal

consistency of the items as a group was expected to be small. However, certain subgroups of items should have related to the same trait items and demonstrated strong internal consistency within themselves.

Performance Measures

Two rating scale measures of the police officers' work performances were collected a few weeks after the other measures. These measures were products of a performance evaluation project being conducted at the police department by a group of researchers in which this writer was a member. This project had a history of several years of preliminary work preceding the final development and administration of the performance measures. Rather than describing the complete chronology of events which culminated in these measures, a brief sketch of the history follows.

The measures originated with a job analysis effort that accounted for the different jobs, ranks, and geographically-separated units in the department. Information was collected by several researchers who interviewed a large stratified sample of police officers.

Items were gathered from available measures of police officer performance while new ones were written from interview material. This pool of old and original items was taken into further interviews with officers. On the basis of these interviews, many items were modified or dropped from consideration and some new items generated.

The resultant pool of several hundred items was then distributed to police officers throughout the department with instructions to pick a fellow officer who was well known and to rate how well each item described that officer. A statistical item analysis of the data led to the discarding of many more items. The remaining items formed the pool used to build the behaviorally-anchored (BARS) and forced-choice (FC) rating scales of performance for each rank in the department.

For privates and privates-first-class (PFC's), the BARS scale was composed of seven 25-point subscales on which an officer was rated by his superior. For corporals, the BARS scale had nine 25-point subscales. Each subscale had behavioral anchors distributed along its range

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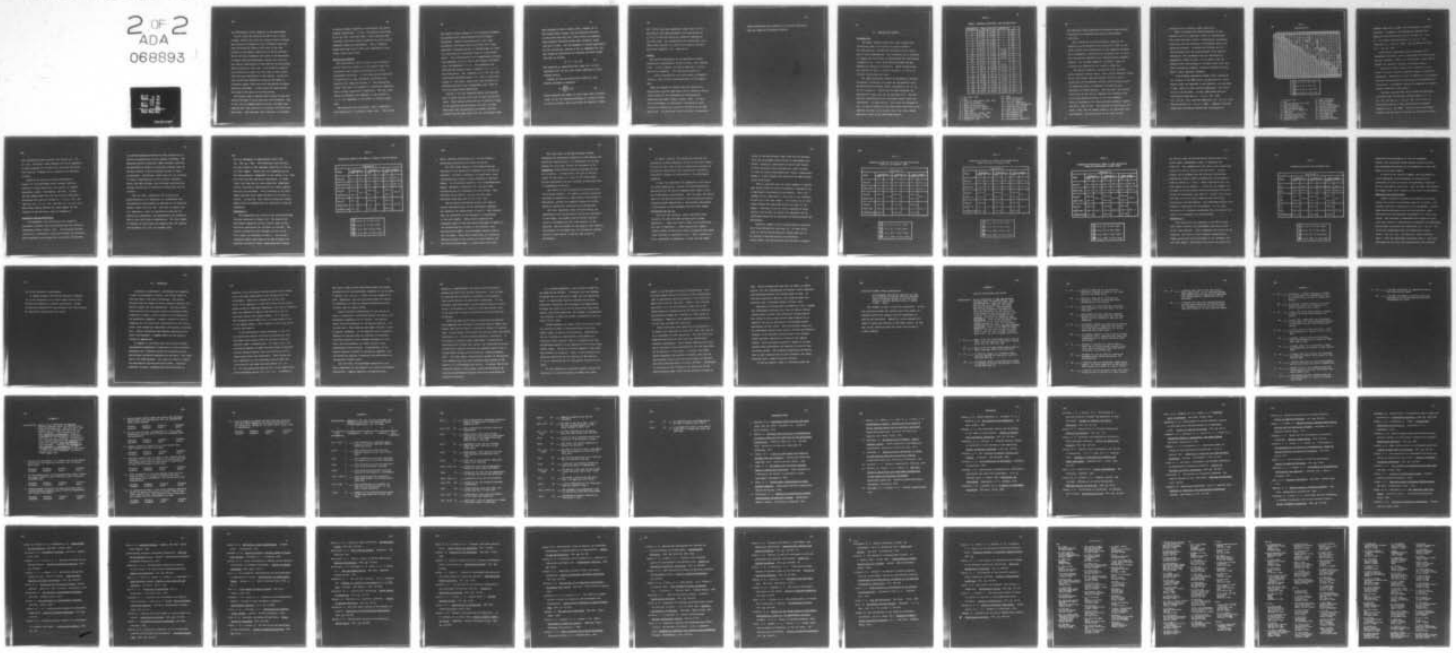

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and represented a basic dimension of job performance.

The FC scales for privates and PFC's had 17 item-tetrads, whereas the scale for corporals had 22 tetrads. Each tetrad was composed of four statements which had been statistically shown on the basis of the item analysis to be equally descriptive of police officers. Two of the four statements were known to be descriptive of highly effective performers, whereas the other two were equally descriptive of both high and low performing police officers at that rank. Each officer's superior was instructed to select the two items in each tetrad that were most descriptive of the officer. Scores for each tetrad were computed by counting the number of statements chosen which were only descriptive of highly effective performers. A total score for each officer was based on the sum of his tetrad scores.

The methods used to develop these scales and the procedures followed in using them were very different. Due to this lack of common method variance, one might have expected that they would not be strongly correlated with each other. Just the same, these measures are presumed

to measure common components of performance and should overlap considerably. In fact, the measures correlated $r=.44$ ($p < .001$) with each other. After equating their variances, they were linearly combined to yield a single composite measure of performance. Such a composite should have been more reliable and comprehensive than either rating scale alone.

Scoring the Measures

The forced-choice locus of control and achivement motive items were scored +2 if the subject chose the alternative that reflected internality or strong achievement motivation. If the alternatives indicative of externality or weak achievement motivation were selected, the items were scored -2. The bureaucratic values items were all oriented in a direction compatible with a strong bureaucratic orientation. The four scale points of agreement (see Appendix 3) were scored -2, -1, +1, +2, depending on the extent of reported agreement.

The perceived work environment items in Appendix 4 were measured on a five-point Likert scale. These items

were used to create indices of "fit" between corresponding personal trait and perceived work environment dimensions. Because the bureaucratic value items manifested a four-point metric and other trait items exhibited a two-point metric, it seemed proper to transform the perceived environment items to a three-point metric. This transformation was accomplished by scoring item responses of one or two on the original five-point scale (see Appendix 4) as -2. Item responses that indicated the original scale's midpoint (i.e., three) were scored zero. And, responses to an item that indicated strong descriptiveness (i.e., four or five) were scored +2. The items' scores were then oriented in a direction parallel with corresponding trait items by reverse scoring where appropriate.

Indices of fit were computed between each matched pair of items from the trait and the work setting measures. These indices were based on the absolute values of the deviation scores between each pair of items. Where more than one perceived environment item was matched with the same trait item, the environment items

were averaged to form a single score, rounded off to the nearest whole integer, and the absolute deviation of this score from the trait item's score was computed. These absolute deviation scores had a potential range from zero to four. For the purposes of testing Hypothesis 1 and its corollaries, indices of fit or compatibility (C_i) were formed by subtracting the absolute deviation scores from four as follows:

$$C_i = 4 - |V_i - E_i| \qquad (5)$$

The resulting C_i ranged from zero (poor fit) to four (excellent fit) for all trait items regardless of their original metric.

Indices of work motivation were formed for each officer according to equation 6:

$$M = \sum_{i=1}^{p=21} [V_i \cdot C_i] \qquad (6)$$

where p equaled the number of trait items under consideration, V_i was the expressed strength of a person's value or trait on item i, and C_i was given by equation 5 above.

Each $(V_i \cdot C_i)$ term had a potential range from -8 to +8. According to this scoring method, the contribution of V_i or C_i to the work motivation composite depended on the other term. For investigating the corollaries, only those items relevant to a given trait entered the work motivation composite (i.e., equation 6).

Comment

Most police departments can be described as highly bureaucratic organizations (Bordua & Reiss, 1966; Cochran, 1975). In this respect, the police department studied here was no exception. All indications pointed to ". . . strict subordination and rigid chains of command" (Cochran, 1975) as basic characteristics of this department.

There are reasons to believe that the bureaucratic orientation of police departments has an important facilitative effect on the achievement of organizational objectives and tasks (Bordua & Reiss, 1966). In such work environments, an individual's bureaucratic value orientation should have a positive influence on his work motivation. In this study, police officers' bureaucratic

value orientations were expected to correlate positively with the composite performance measure.

VI. ANALYSES AND RESULTS

Psychometrics

The means, standard deviations, and reliabilities of measures used in this study are given in Table 1. For some measures, reliability estimates were not available or were inappropriate. For no measure was it possible to compute the test-retest or generalizability coefficients (Cronbach et al., 1972) which would have been the most appropriate indices of reliability. Where reliabilities are reported in Table 1, several different estimates of internal consistency were used.

The Kuder-Richardson formula 14 estimates of internal consistency reliability are given for the personal trait and perceived environment scales (variables 9, 10, 11, 21, 22, 23 in Table 1). While none of these estimates are particularly large, only one is less than 0.55. The poor internal consistency of the achievement motive scale was anticipated. As noted earlier, this scale was designed to tap a variety of behavioral manifestations which show little apparent relation to one another other than their common theoretical bond to the achievement motive.

Table 1

MEANS, STANDARD DEVIATIONS, AND RELIABILITIES

VARIABLE	MEAN	STD.DEV.	RELIABIL.	N
1	0.989	0.105	-	263
2	28.86	2.952	-	263
3	0.668	0.472	-	262
4	1.163	1.297	-	264
5	87.82	4.050	-	260
6	81.04	4.688	-	240
7	0.067	0.249	-	260
8	90.20	9.703	0.816	378
9	0.173	6.515	0.721	417
10	2.777	7.522	0.657	417
11	4.417	4.425	0.476	417
12	25.61	4.756	-	406
13	1.357	0.480	-	417
14	183.7	23.68	0.877	417
15	23.60	4.449	0.671	417
16	644.5	26.47	0.544	417
17	30.95	44.59	0.757	417
18	5.086	20.15	0.703	417
19	9.175	27.43	0.681	417
20	16.69	14.64	0.573	417
21	1.498	2.779	0.741	417
22	0.916	2.941	0.557	417
23	1.195	3.001	0.673	417
24	325.3	42.75	0.842	417

1 = Sex (M=1, F=0)
2 = Age
3 = Military Experience (Y=1, N=0)
4 = Years of College
5 = Basic Training Grade
6 = Physical Fitness Report
7 = Race (Black = 1, White = 0)
8 = IPMA Test
9 = Bureaucratic Values (BUR)
10 = Locus of Control (IE)
11 = Achievement Motive (ACH)
12 = Wonderlic Test
13 = Rank
14 = BARS Performance
15 = FC Performance
16 = Ability Composite
17 = Overall Work Motivation
18 = Work Motivation-BUR
19 = Work Motivation-IE
20 = Work Motivation-ACH
21 = Environment-BUR
22 = Environment-IE
23 = Environment-ACH
24 = Performance Composite

The remaining scales demonstrated moderately good internal consistency for measures which tap multidimensional constructs.

The reliability of the performance composite was computed from the formula given by Guilford (1954, p.393) which involves the reliabilities of the component measures. The FC component's reliability was estimated via the split-half correlation adjusted by the "Spearman-Brown prophesy" formula. For the BARS component, Cronbach's alpha coefficient was computed on the measure's subscales.

The ability composite included the basic training grade, physical fitness report, IPMA, and the Wonderlic tests. Due to the "single score per person" nature of the recorded data on the physical fitness, basic training grade, and Wonderlic tests, no indices of reliability were obtainable on these measures. Just the same, the internal consistency of the ability composite was estimable from the average intercorrelation of the four component measures adjusted by the "Spearman-Brown prophesy" formula (Guilford, 1954, p.359). The computed reliability was not large (.544), but was deemed adequate for hypothesis testing purposes. The reliability of the IPMA test was

estimated from Cronbach's alpha coefficient.

Table 2 presents the intercorrelations of the measures and their associated levels of significance. This table provides a wealth of descriptive information concerning the many bivariate relationships which exist among the measures. Of particular interest are the relationships which the three personal trait measures demonstrate with variables which are theoretically expected to relate to them. To the extent that the measures show relationships to variables that enter into their nomological networks, the more confidence one may have in their construct validity.

From findings reported by Gordon (1973) concerning the validity of his WEPS scale, the bureaucratic values measure (BUR) was expected to show positive relationships to age, tenure or rank, military experience, and internality on the IE scale. In fact, BUR showed positive correlations with age (r = .13, p < .05), rank (r = .15, p < .01), military experience (r = .16, p < .01), and internality (r = .23, p < .0001). Negative relationships were anticipated between BUR and measures of

Table 2

INTERCORRELATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1			**			*							**											
2	04		**						*			*	**											
3	15	49		**	**				**				**								*			*
4	01	-07	-30		**	**			**		*	**	**			**		**					*	
5	02	-11	-17	20		*		**	*			**	**			**		*						
6	15	-08	00	17	13					*				*		**				*	*			*
7	02	-10	05	-02	-01	06		**		*		*				**				*				
8	01	-08	-04	02	27	07	-19		**		*	**			*	**		**						*
9	04	13	16	-18	-12	-03	03	-20		**		*	**		**	**	**	**	**					*
10	08	00	02	02	-01	13	-15	04	23				*		*		**	**	**	*		**		*
11	02	09	03	14	06	11	-04	11	01	05			**				**		*	**				
12	01	-12	-11	21	31	05	-23	48	-16	00	04					**	*	*						
13	09	35	22	-29	-16	01	-10	00	15	09	13	-04		**	*		**	**	*		**		*	**
14	05	07	10	-03	06	13	-06	08	08	07	04	00	27		**		*			*				**
15	08	06	12	-02	08	12	-12	11	13	10	05	04	18	44			**	**	**	**				**
16	05	-06	-11	35	65	40	-17	68	-23	01	06	67	-08	05	05		*	**						
17	04	04	04	-09	-10	11	-10	00	53	48	43	-11	15	11	20	-11		**	**	**		**	*	**
18	03	03	07	-18	-12	-04	02	-14	77	22	03	-11	15	06	16	-18	68		**	**	**			**
19	05	02	00	-02	05	13	-15	00	26	71	10	-08	10	08	14	-05	74	21		**	*	**		**
20	04	06	07	04	03	16	-04	08	08	12	62	-05	06	10	13	02	59	17	20		*	**	**	**
21	02	01	14	05	-01	03	09	05	06	07	05	03	13	04	06	05	09	18	10	12		**	**	
22	04	04	03	-02	07	05	-16	02	-01	14	-04	-06	09	-01	08	04	14	08	21	16	19		*	
23	-01	05	04	-13	02	08	01	-03	05	03	-02	-03	12	06	07	-01	12	06	05	23	-23	17		
24	08	08	13	-03	08	14	-11	11	12	11	05	02	27	83	87	06	18	13	13	14	-02	05	07	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

* = $p \leq .05$ (2 tail test)

** = $p \leq .01$ (2 tail test)

*** = $p \leq .001$ (2 tail test)

**** = $p \leq .0001$ (2 tail test)

1 = Sex (M=1, F=0)
2 = Age
3 = Military Experience (Y=1, N=0)
4 = Years of College
5 = Basic Training Grade
6 = Physical Fitness Report
7 = Race (Black = 1, White = 0)
8 = IPMA Test
9 = Bureaucratic Values (BUR)
10 = Locus of Control (IE)
11 = Achievement Motive (ACH)
12 = Wonderlic Test
13 = Rank (Increasing)
14 = BARS Performance
15 = FC Performance
16 = Ability Composite
17 = Overall Work Motivation
18 = Work Motivation-BUR
19 = Work Motivation-IE
20 = Work Motivation-ACH
21 = Environment-BUR
22 = Environment-IE
23 = Environment-ACH
24 = Performance Composite

academic experience, grades, and intelligence or general reasoning. In support, the BUR measure demonstrated negative correlations with years of college (r = -.18, $p < .01$), basic training grade (r = -.12, $p < .05$), IPMA test (r = -.20, $p < .0001$), and the Wonderlic test (r = -.16, $p < .001$).

While these correlations vary in magnitude and nomological relevance, each is consistent with predictions and past findings. Taken as a collectivity, these results support the construct validity of the BUR measure.

Lefcourt's (1976) review of the literature on the locus of control construct suggested several validational hypotheses. Specifically, level of education, intelligence, and rank were predicted to show positive relationships to internality. Furthermore, Whites were expected to express greater internality than Blacks.

The data revealed that the IE scale was positively correlated with the physical fitness report (r = .13, $p < .05$) and rank (r = .09, $p < .05$), but it was not correlated with any of the intellective or academic measures (e.g., the IPMA). The oft-cited relationship between race and locus of control was replicated; Whites

were significantly more internal than Blacks (r = -.15, $p < .05$). Obviously, these findings are not as impressive as those obtained for the BUR scale, but they are consistent with past findings and are suggestive of construct validity.

Based on the results of studies discussed in Chapter II, the achievement motive measure (ACH) was expected to covary positively with indices of academic experience, grades, intelligence, and rank. In fact, the data demonstrated that the ACH scale was positively correlated with years of college (r = .14, $p < .05$), the IPMA test (r = .11, $p < .05$), and rank (r = .13, $p < .01$). While these results provide very weak support for the validity of the ACH scale, they are suggestive.

Hypothesis Testing Methodology

The hypotheses (and corollaries) were tested by procedures available from the moderated multiple regression methodology (Cohen & Cohen, 1975). This strategy involves testing for a statistical interaction between two variables. Some researchers have argued that statistical interactions

are unstable phenomena because of their sensitivity to scaling transformations of the original variables. The moderated multiple regression (MMR) procedure used here and described in Chapter III provides unbiased tests of the main effects of given variables as well as their interactions. Furthermore, these tests are all invariant to linear transformations of the original variables. Within this MMR strategy, the criticisms concerning the scaling sensitivity of statistical interactions are not relevant.

Just the same, evidence for the validity and generalizability of a hypothesis is strengthened when the predicted relationships are obtained in two different samples rather than just one. This more stringent test of a hypothesis, known as replicability when the two samples are independent, was approached by the procedure used to test this study's propositions. The total sample of officers on which there was complete data for testing the hypotheses (N = 417) was randomly split

into two subsamples of approximately equal size (n_1 = 209, n_2 = 208). Each hypothesis and corollary was then tested on each subsample separately as well as the total sample. Whereas the two subsamples may not have been perfectly independent of one another (e.g., they were both from the same police department), it seems likely that they were at least moderately independent and the criterion of replicability was closely approximated by this procedure. Tests conducted on the total sample provided large sample estimates of the size of effects. In addition, they offered conventional single sample tests for propositions not replicated in the two subsamples.

Hypothesis 1.

This proposition was tested by the hierarchical MMR strategy discussed in Chapter III. The ability and performance composites and the overall index of work motivation constituted the variables of interest. The results obtained for each subsample as well as the total sample are displayed in Table 3. The various regression models which make up the MMR procedure are described in terms of their standardized beta weights

Table 3

REGRESSION RESULTS FOR INDEX OF OVERALL WORK MOTIVATION

HYPOTHESIS 1						
MODEL	SUBSAMPLE 1		SUBSAMPLE 2		TOTAL SAMPLE	
	Beta	R	Beta	R	Beta	R
ABILITY	.023 ns	.023 ns	.090 ns	.090 ns	.057 ns	.057 ns
MOTIVATION	.233 **	.233 **	.153 *	.153 *	.181 **	.181 **
ABILITY + MOTIVATION	.059 ns .242 **	.240 **	.096 ns .157 *	.181 *	.076 ns .189 **	.196 **
ABILITY + MOTIVATION + INTERACTION	.051 ns .242 ** .019 ns	.242 **	.092 ns .156 * .011 ns	.184 *	.071 ns .187 ** .016 ns	.197 **

* = $p \leq .05$ (2 tail test)

** = $p \leq .01$ (2 tail test)

*** = $p \leq .001$ (2 tail test)

**** = $p \leq .0001$ (2 tail test)

(Beta), multiple correlations (R), and the levels of significance associated with these statistics.

The first model tested was the simple bivariate regression of the performance composite onto the ability composite. As Table 3 indicates, no significant linear relationship was found in either subsample or the total sample. In a bivariate regression, the standardized beta weight, "multiple" correlation (R), and zero-order correlation are all synonymous with one another. From the first row of Table 3, one can see that these statistics were less than 0.10 in every case.

The bivariate relationship between the index of overall work motivation and the performance composite was tested by the second model in Table 3. This relationship was replicated in the subsamples and maintained in the total sample. These results supported the congruence model of work motivation developed in Chapter IV and corroborated the validity of the personal trait, perceived environment, and performance measures used to test the model. While this finding does not constitute definitive proof of the validity of these measures and the work motivation model, it does bolster the claim.

The third stage of the MMR strategy involved regressing the performance composite on both ability and motivation simultaneously. An examination of the beta weights for this model reveals the strengths of the independent relationships between performance and the two variables. In other words, the test of the beta weight for motivation is a test of the relationship between performance and that variance in motivation that is independent of ability.

The results of this analysis were consistent with the previous findings. The index of overall motivation continued to demonstrate a replicatable relationship to performance, whereas the composite measure of ability showed no significant association with performance.

The final regression model involved testing the comprehensive ability-motivation interaction hypothesis. In this model, the product term of ability and motivation is included with both "main effects" in the equation. The beta weight for the product term indicates the presence of non-additivity (or interaction) between ability and motivation in the way they relate to performance.

As Table 3 reveals, the interaction term was non-significant in both subsamples as well as the total sample. The beta for the index of overall motivation retained its statistical significance under replication, and ability continued to display no relationship to the performance composite.

In sum, this hypothesis was supported in only one of its three propositions. Neither the ability-motivation interaction nor the ability composite were found to have any relationship to performance. Just the same, the overall index of work motivation derived from the person-situation congruence model demonstrated a replicatable relationship to performance in both subsamples and the total sample.

Corollaries 1A, 1B, 1C.

With only one exception, these corollaries were tested by the identical MMR strategy used to study Hypothesis 1. Where the overall index of work motivation was used in Hypothesis 1, these propositions adopted reduced indices of motivation which incorporated only those items relating to a particular trait. Thus, Corollary 1A was a restatement of Hypothesis 1 except for the compu-

tation of the motivational index from only the personal trait and environment items related to achievement motivation. Similarly, Corollaries 1B and 1C used indices of work motivation which included only items relating to locus of control and bureaucratic values, respectively. Tables 4, 5 and 6 display the results of the MMR analyses of the corollaries.

Table 4 indicates that the index composed of achievement motive items and their environmental complements had a significant relationship to performance. While this finding was not replicated, it did occur in one subsample as well as in the total sample. No evidence for an interaction between the index and ability was found in any sample. Corollary 1A was not fully confirmed by these results, yet the data do suggest the importance of the achievement motive as an antecedent of work motivation and performance.

Similarly, Tables 5 and 6 provide results consistent with those obtained for Corollary 1A. In other words, locus of control and bureaucratic values seem also to be related to work motivation and performance. Interestingly, the correlations given in Table 2 between

Table 4

REGRESSION RESULTS FOR INDEX OF WORK MOTIVATION
BASED ON ACHIEVEMENT ITEMS

COROLLARY 1A						
MODEL	SUBSAMPLE 1		SUBSAMPLE 2		TOTAL SAMPLE	
	Beta	R	Beta	R	Beta	R
ABILITY	.023 ns	.023 ns	.090 ns	.090 ns	.057 ns	.057 ns
MOTIV-ACH	.108 ns	.108 ns	.193 **	.193 **	.139 **	.139 **
ABILITY	.020 ns		.084 ns		.054 ns	
+		.110 ns		.211 **		.150 **
MOTIV-ACH	.107 ns		.191 **		.138 **	
ABILITY	.015 ns		.075 ns		.048 ns	
+						
MOTIV-ACH	.106 ns	.112 ns	.184 **	.214 **	.134 **	.155 **
+						
INTERACTION	.008 ns		.010 ns		.012 ns	

* = $p \leq .05$ (2 tail test)

** = $p \leq .01$ (2 tail test)

*** = $p \leq .001$ (2 tail test)

**** = $p \leq .0001$ (2 tail test)

Table 5

REGRESSION RESULTS FOR INDEX OF WORK MOTIVATION
BASED ON LOCUS OF CONTROL ITEMS

COROLLARY 1B						
MODEL	SUBSAMPLE 1		SUBSAMPLE 2		TOTAL SAMPLE	
	Beta	R	Beta	R	Beta	R
ABILITY	.023 ns	.023 ns	.090 ns	.090 ns	.057 ns	.057 ns
MOTIV-IE	.200 **	.200 **	.072 ns	.072 ns	.130 **	.130 **
ABILITY	.041 ns		.089 ns		.032 ns	
+		.204 **		.115 ns		.134 *
MOTIV-IE	.203 **		.071 ns		.132 **	
ABILITY	.029 ns		.083 ns		.030 ns	
+						
MOTIV-IE	.197 **	.210 **	.062 ns	.119 ns	.128 **	.135 *
+						
INTERACTION	.007 ns		.012 ns		.007 ns	

* = $p \leq .05$ (2 tail test)

** = $p \leq .01$ (2 tail test)

*** = $p \leq .001$ (2 tail test)

**** = $p \leq .0001$ (2 tail test)

Table 6

REGRESSION RESULTS FOR INDEX OF WORK MOTIVATION
BASED ON BUREAUCRATIC VALUES ITEMS

COROLLARY 1C						
MODEL	SUBSAMPLE 1		SUBSAMPLE 2		TOTAL SAMPLE	
	Beta	R	Beta	R	Beta	R
ABILITY	.023 ns	.023 ns	.090 ns	.090 ns	.057 ns	.057 ns
MOTIV-BUR	.179 **	.179 **	.112 ns	.112 ns	.130 **	.130 **
ABILITY + MOTIV-BUR	.069 ns .195 **	.191 *	.104 ns .124 ns	.153 ns	.052 ns .139 **	.139 **
ABILITY + MOTIV-BUR + INTERACTION	.060 ns .189 ** .011 ns	.193 *	.102 ns .120 ns .006 ns	.154 ns	.050 ns .135 ** .007 ns	.140 *

* = $p \leq .05$ (2 tail test)

** = $p \leq .01$ (2 tail test)

*** = $p \leq .001$ (2 tail test)

**** = $p \leq .0001$ (2 tail test)

the overall index of work motivation and the three trait scales appear approximately equal in magnitude and direction. This suggests that all three traits contributed roughly the same to overall work motivation. Further support can be gleaned from the bivariate correlations between the reduced indices of motivation and performance given in Tables 4, 5, and 6. These correlations are also very similar to one another. A final bit of evidence can be found in the zero-order correlations between the traits' scales and performance (see Table 2). Bureaucratic values and locus of control scales demonstrated significant correlations with performance. The achievement motive scale showed no association with performance. In sum, this collectivity of findings corroborates the relevance of each trait as an antecedent of work motivation.

Hypothesis 2.

This proposition was examined via the MMR strategy with locus of control and achievement motivation scales as the "main effects". Table 7 presents the results of the analysis. The locus of control measure demonstrated a simple correlation with performance in one subsample and the total sample. Achievement motivation was found to be

Table 7

REGRESSION RESULTS FOR HYPOTHESIS TWO

HYPOTHESIS 2						
MODEL	SUBSAMPLE 1		SUBSAMPLE 2		TOTAL SAMPLE	
	Beta	R	Beta	R	Beta	R
IE	.152 *	.152 *	.054 ns	.054 ns	.109 *	.109 *
ACH	.029 ns	.029 ns	.133 *	.133 *	.049 ns	.049 ns
IE + ACH	.156 * .045 ns	.158 ns	.054 ns .134 *	.143 ns	.102 * .044 ns	.115 *
IE + ACH + INTERACTION	.128 ns .051 ns .037 ns	.160 ns	.068 ns .137 ns .017 ns	.145 ns	.080 ns .038 ns .029 ns	.117 ns

* = $p \leq .05$ (2 tail test)

** = $p \leq .01$ (2 tail test)

*** = $p \leq .001$ (2 tail test)

**** = $p \leq .0001$ (2 tail test)

associated with performance in only one subsample. Finally, the interaction effect between locus of control and achievement motivation was not supported in either subsample or the total sample.

In spite of its intuitive appeal, Wolk and DuCette's (1973) hypothesis that performance is affected by an interaction of locus of control and achievement motivation was not confirmed by these data. Just the same, the evidence did suggest some linear effects of the traits on performance.

Additional Data Explorations.

Several regression analyses were conducted to further explore the certain relationships among the variables. One analysis involved an examination of the independent relationships between performance and the three personal traits. Performance was simultaneously regressed on all three trait scales. The individual standardized beta weights for each trait were tested for significance and examined for usefulness. The multiple correlation was significant ($R = .152$, $p < .02$) as was the standardized beta for bureaucratic values (Beta = .104, $p < .04$). The betas for locus of control (Beta = .078) and achievement motivation (Beta = .044) were both positive, but they were nonsignificant and accounted

for little variance in performance.

A second analysis involved the question of whether any of the individual trait scales might interact with the ability composite to predict performance. An MMR analysis was conducted for each personal trait with ability. No significant interactions were found.

VII. DISCUSSION

According to Hypothesis 1, performance was expected to show relationships to ability, the overall index of work motivation, and their interaction. The results obtained from the sample of police officers indicated only partial support for this proposition. The motivational index derived from the person-situation congruence model presented in Chapter IV had a positive relationship with the performance composite. However, neither the ability composite nor its statistical interaction with the motivational index showed any significant relationship to performance. Before considering some possible explanations for these "non-findings", a comment about the one positive finding is appropriate.

In Chapter I, the notion that the interactive model represented by Hypothesis 1 could serve as both a testable hypothesis and a heuristic device for examining certain motivational and ability measures was discussed. This study used it for both purposes. As a heuristic device, support was obtained for the work motivation model. Generally speaking, the model conceptualized work motivation as

dependent on an interaction between personal work-related traits and their compatibility with the perceived work environment. Based on an integration of the traditional "trait approach" to work motivation and the general person-situation congruence hypothesis, this fairly elaborate model was expected to explain work motivation and its correlates better than simpler models. If it did not, then parsimony would demand that it be discarded in lieu of the simpler models. Some evidence on this issue can be gleaned from Table 2.

If the motivational indices developed to test the corollaries were better correlates of performance than the simple trait scales, then the utility of the more elaborate model is demonstrated. For every trait, the correlation between its model-dictated index and performance was visually greater than the correlation of its simple scale score with performance. This finding was most impressive for the achievement motive where the correlation of the index with performance (r = .14, $p < .01$) was significant whereas that of the simple scale with performance was not (r = .05, n.s.). Furthermore,

the overall index of work motivation showed the largest correlation with the performance composite of any variable in Table 2 (r = .18, p = < .0001) with the exception of rank. Apparently, the work motivation model can justify its complexity in terms of greater performance-related validity than the simple scales.

Several plausible explanations for the failure to obtain a significant relationship between the ability and performance composites can be offered. One possible reason involves weaknesses in the ability measures. For the most part, these measures were paper and pencil tests of general reasoning. If the important skills needed by officers for dealing with law violators are different from those needed to solve academic problems on a test form, then such measures are likely to have little performance-related validity. Interestingly, of the several measures included in the ability composite, the one having the greatest correlation with performance was the physical fitness report.

Just the same, the performance measures may have been responsible for the absence of an ability-performance correlation. Suppose superiors' ratings were more

sensitive to subordinates' attitudinal and motivational propensities than their ability differences. Just as there are both quality and quantity dimensions of performance, there may be ability and motivational dimensions. In this situation, one would expect the performance measure to demonstrate a relationship to indices of work motivation, while at the same time, to show no connection with valid measures of ability.

While the BARS and FC measures underlying the performance composite were developed to minimize certain common rater biases, they are not robust to deliberate efforts to sabotage them. In this study, the ratings were obtained under operational conditions (i.e., to aid in making promotion decisions). In this type of situation, where individuals' careers may be affected by the ratings they receive, the likelihood of certain rating errors (such as leniency) was probably greater than in studies where ratings are collected for "research purposes only". For this reason, the potential validity of the performance composite may have been undermined and resulted in the absence of a relationship with ability. Of course, due to the concurrent nature of this study, range restrictions on the ability and performance measures could have constrained the obtained correlation.

As a testable hypothesis, the interactive model was not supported by the data. Consistent with the findings of Howard (Note 2) and Lawler (1966) who also tested the model, no significant connection between the ability-motivation interaction and performance was demonstrated. Although the notion of an ability-motivation interaction remains intuitively appealing, the evidence of accumulated "non-findings" is mounting against its generality for all people and all jobs.

Perhaps Cummings and Schwab (1974) were correct about the interactive model's inappropriateness within the middle ranges of ability and motivation. Assuming that the two variables are approximately distributed as a bivariate normal function, then it is apparent that the overwhelming majority of the population falls within these middle ranges. The police officers sampled in this study were probably no exception. Thus, if the variables were operating additively for the majority of the officers, it is not surprizing that no significant interaction was found.

To find significant interaction between ability and motivation, it may be necessary to sample only those

people at the extremes of ability and motivation. This strategy should lead to an increase in the average magnitude of interaction term beta weights if the interactive model holds true for such data. However, this strategy may result in a loss of statistical power due to the fewer degrees of freedom incurred by selective sampling. The interactive model will continue to "make sense" to researchers. Hopefully, more appropriate methodologies will be soon available for their use.

Three corollaries were associated with Hypothesis 1 to explore the importance of each trait (ACH, BUR, AND IE) as an antecedent of work motivation. The work motivation model-derived index for each trait was significantly related to performance. This finding suggests that every one of the three traits contributed to the work motivation of the officers in this study. Of course, this study leaves unanswered the question of whether there are any more personal traits and values which impact on the work motivation and performance of police officers. Furthermore, we are given no data concerning the generality of the work motivation model itself across different classes of

jobs. Future research may find that the model is indeed general, but the configuration of personal traits affecting work motivation differs for various types of jobs. As with most scientific research, this study provokes more questions than it provides answers (Pirsig, 1974).

Hypothesis 2 restated Wolk and DuCette's (1973) finding that achievement motivation and locus of control operate interactively to affect work motivation and performance. The results of this study revealed some evidence for an additive, but not an interactive, relationship between performance and the traits. While one obvious reason for the discrepancy between these results and Wolk and DuCette's findings is the different measures used in the studies, another possible explanation is based on the samples studied. Wolk and DuCette examined a sample of college students where performance was measured in terms of test and course grades. The processes underlying task motivation in that situation may be quite different than those operating with a sample of police officers.

To sum up, Howard's (Note 2) conclusion about the

interactive model remains appropriate:

> One direction that future research can take is to confirm in both the same and different types of settings whether or not the interaction of ability and motivation is indeed a myth. (p.89)

The evidence to date is weak and inconclusive. So far the interactive model has actually been most useful as a heuristic device for studying certain conceptions of ability and motivation. Hopefully, future research will begin to assess the validity of the model itself. In this way, we may eventually know the truth value of Hull's (1928) prophesy.

APPENDIX 1

General Work Beliefs and Values

Instructions: We are interested in your own personal opinions about the world of jobs, work, and occupations. Not just about your present job or occupation, but about all jobs in general. Your responses will be kept completely confidential. Only the researchers at the University of Maryland will see your response. The value of this research depends on the accuracy with which you represent your own opinion. Each of the following items consists of two or three statements. Select the one (and only one) statement in each set or pair which you most strongly agree with. There are no right or wrong answers. Put an X next to the one statement in each set that you most strongly agree with. Be sure to answer every item.

1. (a) _____ Most of the bad experiences people have on their jobs are not their own fault; people often run into some bad luck.

   (b) _____ Most of the bad experiences people have on their jobs are simply their own fault.

2. (a) _____ In general, people can influence their salaries through the quality or worth of the work they do.

   (b) _____ In general, people's salaries have little or nothing to do with the quality or worth of the work they do.

3. (a) _____ Getting a good job in this world is basically a matter of being in the right place at the right time.

   (b) _____ Getting a good job in this world is basically a result of planning ahead, determination, and ability.

4. (a) _____ Most people in this world get job promotions because of who they know, not what they know.

   (b) _____ Most people in this world get promoted because of what they know; who they know means little or nothing if they are not competent.

5. (a) _____ In general, people in this world are better off working for a supervisor who shares with them the responsibility for making decisions about their work.

   (b) _____ In general, people in this world are better off working for a supervisor who takes full responsibility for making decisions about their work.

6. (a) _____ Success or failure on a job or task is often due to forces beyond a person's control, such as getting a few lucky breaks or having a run of bad luck.

   (b) _____ Success on a job or task is a matter of planning ahead, making decisions, and determination.

7. (a) _____ I believe that the situations, supervisors, people, and other aspects of my job environment control my actions to a great extent.

   (b) _____ I believe that my personal values and intentions control my actions to a great extent.

* 8. (a) _____ I believe that most of the job environments people work in are confusing because work organizations do not provide employees with enough specific information and job structure.

(b) _____ I believe that most work organizations do provide their employees with enough specific information and job structure so that they find security in their job environment.

APPENDIX 2

1. (a) _____ In general, I prefer working as a member of a group where the responsibility for the results of my actions is shared with others.

   (b) _____ In general, I prefer working as an individual and having full responsibility for the results of my actions.

* 2. (a) _____ I most like tasks where success is simply a matter of my own determination and skills.

   (b) _____ I most like tasks where the excitement of an element of chance determines success in addition to my own determination and skills.

3. (a) _____ I prefer tasks of high difficulty, where the probability of success is low (1% to 15%).

   (b) _____ I prefer tasks of moderate difficulty, where the probability of success is about even (40% to 60%).

   (c) _____ I prefer tasks of low difficulty, where the probability of success is high (85% to 100%).

4. (a) _____ I prefer jobs that involve the challenge of competing against other people or some kind of goal.

   (b) _____ I prefer jobs that are easily performable and do not involve any kind of competition.

5. (a) _____ Whether or not I get feedback about the effectiveness of my work performance does matter much to me.

   (b) _____ Not getting specific feedback about my work performance is a source of discomfort to me.

6. (a) _____ I am most interested in improving my skills and advancing my career.

(b) _____ I am most interested in getting along well with people at work and maintaining close friendships with them.

APPENDIX 3

Instructions: Again, we are interested in your own personal opinions about the world of jobs, work, and occupations. Not just about your present job or occupation, but about all jobs in general. Your responses will be kept completely confidential. Only the researchers at the University of Maryland will ever see your responses. The value of this research depends on the accuracy with which you represent your own opinions to each statement. Indicate the strength of your agreement or disagreement to each statement by circling only one of the alternatives under each statement. Be sure to answer every item.

1. In most work situations, the higher level people should make most of the important decisions for the people below them.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

2. In the working world, relationships among people should be formal, based on rank or position, not on personal considerations.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

3. Working people are better off when their work organizations provide complete sets of rules and regulations and "stick to the book."

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

4. Working people should adopt the loyalty and attitudes toward their work organization that are expressed by their fellow workers.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

5. In the world of work, satisfaction on a job is best obtained by learning and following the standard rules and procedures.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

6. Workers should do things in the exact manner that their bosses wish them to be done.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

7. For work organizations to operate like "smooth running machines," it is best for tasks to be broken down into many simple parts and for each person to specialize on only one or another of the parts.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

8. Since innovative or new work methods often fail the "test of time," it is best to maintain the long established rules, procedures, and traditions in work organizations.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

* 9. In the world of work, a very strong emphasis should be placed on things like years of service, rank or position, loyalty, etc., when decisions about promotions, pay raises, and work assignments are made.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

* 10. Working people are better off when they are concerned with only their immediate job and not involved with the business or "goings on" of other units, ranks, jobs, or departments.

Strongly Disagree	Slightly Disagree	Slightly Agree	Strongly Agree

APPENDIX 4

Instructions: Indicate to the left of each statement how frequently you think each condition occurs in your organization, job, or tasks.

1	2	3	4	5
Very Infrequently	Infrequently	Sometimes	Frequently	Very Frequently

(B-1, IE-5) 1. ____ This organization encourages supervisors to consider employee ideas in making decisions.

(IE-3) 2. ____ This organization seeks the best possible people for the jobs it has open.

(A-6) 3. ____ This organization provides employees the opportunity to develop themselves.

(A-6) 4. ____ This organization provides opportunities for professional training.

(IE-2) 5. ____ This organization directly relates rewards to the employees' performance.

(IE-1, IE-6) 6. ____ This organization has conditions which keep people from getting their jobs done.

(B-3, B-8) 7. ____ This organization is flexible (it does not "go by the book") in the way it makes decisions.

(IE-4) 8. ____ People in the organization get ahead on who they know and not what they know.

(IE-3)	9.	____	This organization's personnel practices result in people who are unable to handle the job.
(B-3, B-5)	10.	____	This organization enforces rules and regulations.
(A-5)	11.	____	Supervisors I work with use the rewards they have (praise, performance appraisals) to let people know when they've done a fine job.
(B-7)	12.	____	Employees on the job are informed about how their job fits in with other jobs.
(A-5)	13.	____	Supervisors I have contact with discuss employee job behaviors with them.
(A-4)	14.	____	Each job is given certain specified goals to be attained.
(IE-1, IE-6)	15.	____	Conditions on my job do <u>not</u> permit people to reach their work goals.
(A-6)	16.	____	People on the job lack the opportunity to develop new skills and abilities.
(IE-1, IE-7)	17.	____	Conditions on my job are confusing.
(A-6, B-2)	18.	____	People on the job establish personal friendships.
(B-4)	19.	____	People around here talk about the pride they have in their job.
(B-1, B-6)	20.	____	Supervisors I deal with are experts at the jobs they supervise.
(B-1, IE-5)	21.	____	The tasks I work at require me to make different kinds of decisions.

(IE-6)	22.	____	Supplies needed for my job are available.
(A-5, B-7)	23.	____	My task is set up so that I get to see the finished product as the final outcome of what I do.
(A-3, A-4, B-7)	24.	____	My task requires me to do pretty much the same things over and over.
(A-3)	25.	____	I have to learn difficult skills and abilities in performing my tasks.
(A-6)	26.	____	The tasks I do require updating of skills and abilities.
(A-1, B-1, IE-7)	27.	____	My task is set up so that I can determine the procedures for getting the work done.
(A-5)	28.	____	My task does <u>not</u> allow me to find out how I am doing on the job.
(A-5)	29.	____	I find out very quickly whether my task performance is appropriate.
(A-1, B-1, IE-5)	30.	____	The duties I have are set up so that I make decisions about what I work at.
(A-1)	31.	____	The tasks I work at are set up so that I do <u>not</u> work with others.
(B-7)	32.	____	I have responsibility for doing more than one specific task.
(IE-1, IE-6)	33.	____	The equipment and procedures I use in getting my tasks done break down.
(A-3)	34.	____	Performing my duties requires all the skills I have.

(A-1) 35. ____ An important part of accomplishing my task is working with others.

(IE-7) 36. ____ I am moved from task to task before being able to completely learn any one task.

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